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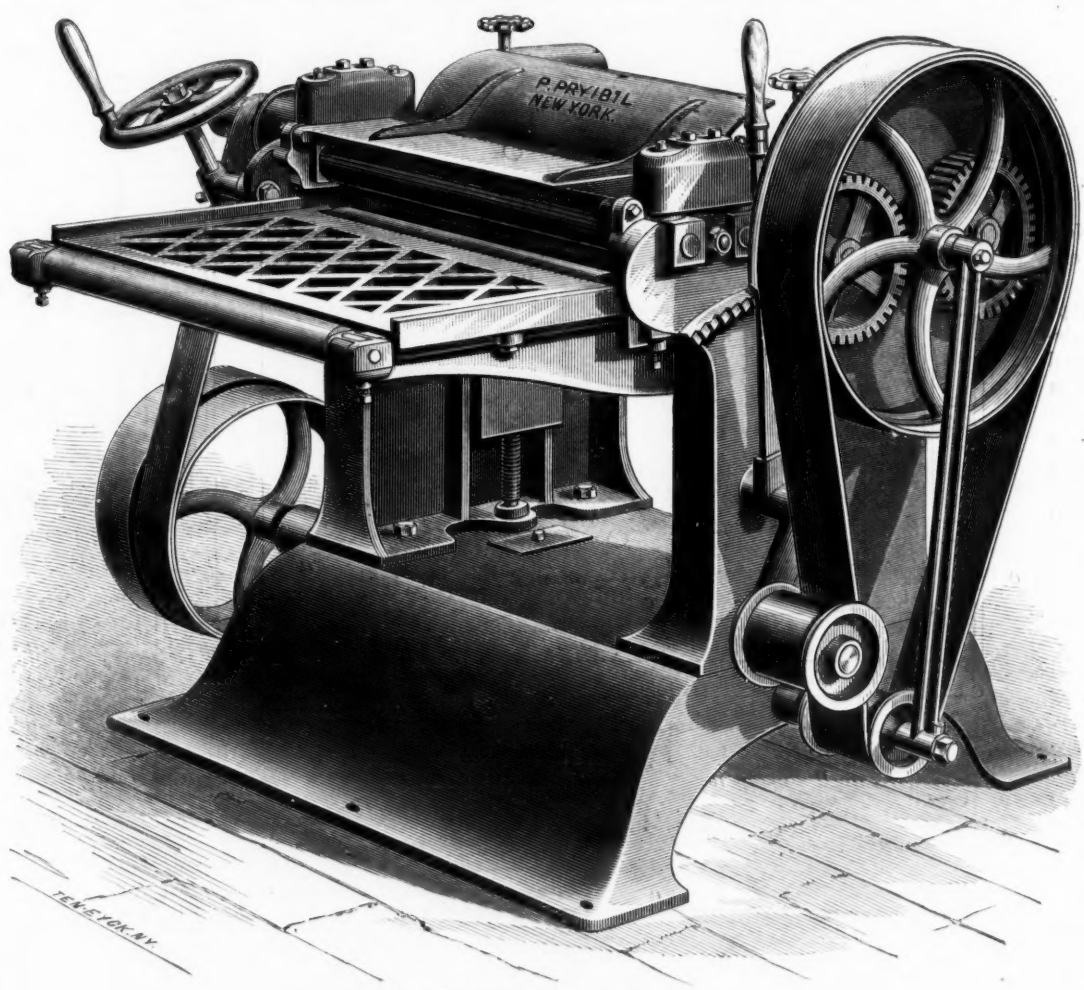
New Double-Feed Planing Machine.

Fears have been entertained by many progressive mechanical engineers that the rush of orders during the past few months, for machinery and tools, would have the effect of checking improvements in their design and manufacture. Few establishments, having an abundance of orders for the productions already introduced, have any inclination to put forth special efforts to persuade the public of the merits of those yet untried. These fears may have a good foundation to rest upon in some quarters, but, as a whole, they are groundless. The ready demand for an improved class of tools and machines stimulates inventive and constructive energy, and gratifying results are becoming more numerous almost every day. In wood-working machinery, some of the most notable improvements are being made. We present on this page one of the latest designs of wood planers.

The machine herewith represented is adapted to both heavy and fine work, and especially to hard wood. It will plane six inches thick and twenty-six inches wide, and is capable of planing pieces not more than six inches long. It has four sets of feed rolls, two on each side of the cutter head, and owing to the consequent strength of the feed the pressure bar can be pressed very firmly upon the stuff, thereby insuring even work and preventing the cutting in on the ends, common to so many machines of its class. The two smooth back rolls are provided with self-adjusting scrapers, which remove from them any gum or other adhering matter which would otherwise injure the finished surface of the wood.

The bed, which measures four feet five inches from center to center of end rolls is raised and lowered by screws worked by the inclined shaft and hand-wheel, shown at the left of the machine, one complete turn of the hand-wheel elevating or depressing the bed $\frac{1}{16}$ of an inch, an index on the side of the frame always showing the full thickness to which the machine is set to plane. The bearings are all long, and the boxes are self-oiling.

The whole is set upon a base covering a large space. The base being cast in one piece, is not liable to twist when placed upon an uneven or yielding floor and thereby strain the parts or bind the bearings It can be driven from above, below, or from the side, and its weight is about eighteen hundred pounds. It is manufactured by P. Pryibil, 461 West 40th St., New York.



NEW TWENTY-SIX INCH PLANER.

Oswego has concluded to postpone till next season the establishment of a beet sugar factory. In view of the lateness of the season, which would prevent the erection of a manufactory in time for the beet harvest, a failure would be made the first year if contracts for the roots were made at this time. But everything is to be put in readiness for next year. J. J. Jova is the Cuban planter who has put $25,000 into the enterprise.

Extracts from Chordal's Letters.

Mr. Editor:

* * * * Many manufacturers jump at the conclusion, if they have something to sell which it is to a party's real interest to buy, that the party will buy if he has the money. This won't do at all; economical devices cannot be sold on their merits. Geography enters largely into the question; people in one locality are frugal, thrifty, and rich; they spend a dollar to save two, and by that means gain their riches. In another locality, the people will positively decline to spend a dollar to save ten. They are not frugal, they are not prudent, they are thrifty and they are rich. A Texas farmer would starve to death in Connecticut; he would not work hard enough to get a living out of the soil; the soil is different, and he comes from a different class of people.

* * * * The steam engine is essentially an element of modern economy; the steam engine is not the same the world over, by a great deal. In our Southern States, many long stroke, slow speed engines use their steam at nearly full stroke. In the Middle States, proportions are changed; the lap of the valve is increased, a variable cut-off added, and, once in a great while, an automatic cut off is found. In the older New England States, we find the finest types of automatic cut-off engines predominant, and, in many cases, a condenser added. In the old countries of Europe, every pool of water is found steaming hot with the discharge of numberless condensers.

* * * * If a hundred horse-power engine, using steam full stroke, is kept in fuel for fifteen dollars a day, it is doing well. If the valve of this engine be altered, and the throw increased, ten dollars will buy the coal required each day. If it cost ten thousand dollars to lengthen this valve, the investment would be a capital one. Such a change costs, in fact, about fifty dollars. If a good automatic valve gear be put on the engine, six dollars and a half will pay for the coal required. The three dollars and a half a day thus saved would be good interest on ten thousand dollars. The change can generally be made for five hundred dollars. If water is handy, and a good condenser be added, five dollars a day will pay for the coal required. The dollar and a half a day thus saved will be good interest on ten thousand dollars. The change can generally be made for a thousand dollars. If a man has a hundred horse-power engine, using its steam full stroke, and will, at one bold stroke, make it properly automatic and condensing, he will save ten dollars a day, or ten per cent. on thirty thousand dollars.

* * * * You would think, Mr. Editor, if you were the proud builder of a tip-top condensing engine, with automatic cut-off, if you held this hundred horse-power engine for three thousand, or four thousand, or five thousand dollars, if you offered it for sale in localities where wasteful engines were used, that there would be such an overwhelming rush of orders that you would go crazy. But such would not be the case, Mr. Editor; there would be no rush of orders from such a locality, and if you went daft it would be from disappointment The place to sell such engines is right where people use such engines. I don't build such engines myself, and have had no experience in the matter, but I leave it to any high class engine builder in the country who has ever tried to introduce his engines in localities where the greatest economical changes could be wrought.

* * * * It is the miser who seeks new ways of saving money. It is the prodigal who welcomes new suggestion as to spending money. If we get along with something mean, we don't care if it gets a little meaner. If we appreciate that which is good, we will seek for that which is better. Bad leads to worse, and good leads to better.

* * * * Speaking of investment, Mr. Editor, leads me to think that there is a great geographical difference in our capitalists. I made a short stay in the Middle States lately, and noticed that as a general thing there was but little capital invested in what in the East would be considered as well equipped factories. I refer here to metal industries exclusively. Eastern manufacturers are cautious about picking up a thing, but when they do it they have a good grip on it. It is no unusual thing to find a new building in New England, out of which, for two years, come an army of workmen, all drawing good pay. This is to be a factory some day. Thousands and thousands of dollars are being spent in equipping the concern with the most efficient machinery. Not a pound of goods going out—not a dollar coming in.

Every little expense which promises to return itself a hundred fold, when things start up, is borne with patience. This thing would work in the West for about three weeks, and then capitalists would begin to ask, when this paying out process was going to stop. There are exceptional cases, of course, but as a general thing Western capitalists have been very slow about investing in manufacturing business. It don't seem enough like trade. In trade, you pay money for an article which you sell instantly at an advance. As soon as you part with your money you have its equivalent. But in the factory things are different. The big money goes, perhaps, into special machinery, which is not for sale, or salable. The main money is invested in a process. In New England the intention seems to be to fix for making money, no matter what it costs. You will see little of this kind of business done in metal in the West.

The New England factory evidently purposes commencing when it commences. In the West "business" commences as soon as money commences to go out, and Western men are not up to paying out long at a time without looking around for a return.

The Westerners will take up with a good thing, get it into crude shape; manufacture in a sort of a way, go into the market, and fail on account of the general prematureness of the thing, and they will do it all before the New Englander decides to put money into it. But when the thing is pronounced all right,

the New Englander does take hold of it sure enough.

If the article is a new invention, whose raw principle is full of certain promise, special skill is employed to get it into a superior practical form. This is often omitted in the West. After being reduced to a practical, useful form, special skill is employed to get it into a shape adapted to systematic manufacture—to machine construction—to cheap excellence. This is almost always omitted in the West. The sample being done, special skill is employed to contrive and construct special machinery for its production. This is almost always omitted in the West. These things cost a fearful sight of money, and the Western folks have not learned to stand the strains.

In New England, after the crude principle is approved, after the most useful form is given at great expense, after the form has been adapted to manufacture, after a world of special machines have been contrived and built, after two or three years' time, and say two hundred thousand dollars have been expended—then, and not till then, are the factory doors thrown open, and the world informed that this is a screw-driver factory, or some such thing. Then the product is offered, and then the public buys. The article they buy is as good as money and skill can produce it, and sales will continue till such an article is no longer needed. All this may happen after the same article, in a general way, has failed on the market, owing to a premature delivery. You know I am no Yankee, Mr. Editor, so I am not blowing. I may possibly have a better motive.

* * * * As an example of New England operations, let me cite one case.

A steam engine of entire new type was devised. It was taken to a celebrated concern. It was approved, and taken in hand. An engineer skilled in the science of steam and mechanics re-designed it. An engineer's skill in manufacturing joined hands and heads with the steam man and the result was a machine which looked all right to the steam man, and which the factory man said he could make well, and cheap, and profitably. Then a few were made as any single article would be made.

In the West these few engines would have been sold and some money brought in. But not so in this case. These engines were put to work, surrounded by skilled tests. They confirmed the judgment of the parties who were "looking into it." Did they go to work and sell them then? No sir. They then began the tests for *durability*. Hour after hour, and month after month—every hour that there was steam in the factory boilers, did these engines whirl away at their heaviest loads, under every possible change in work and handling, and under the closest of scrutiny. They are running yet and will be running next Christmas. When this test is over will these factory people commence to make this engine for sale? I doubt it. I do not think they will ever "make" these engines. When the tests are over the system of manufacture, already in view, will be elaborated, and then a fortune will be expended in appliances, and then, and not till then will the public be asked to buy. The engines will be *manufactured*, not "made," and that "manufacture" means a well studied and economical production which is to the benefit of all concerned. All this, of course, in case this engine proves "durable." It may be disappointing, in which case the whole thing will go into the scrap pile; and the cost will be charged to expense, and will be a small loss to a concern which has accumulated millions of dollars by a continued demand for articles treated in the same careful, cautious, painstaking manner.

These heavy investments based on a hope of future return are not an inventor's worship of his idol. This engine came from afar. These are capitalists looking up investments.

I honestly think that, if this same engine had been sprouted in the West, it would have been in the market years ago and more than likely it would have been "dead, buried and resurrected, and its body strung on wires."

* * * * Another case. A Western firm "made" a certain machine. Cut prices began to bring the blood. There was competition from New England. Both parties made the machine quite well. The Western firm resolved that something must be done to cheapen the machine. It could not be made any lighter for it only had panic thickness anyhow. Wages could not be cut for there was no substance to cut at.

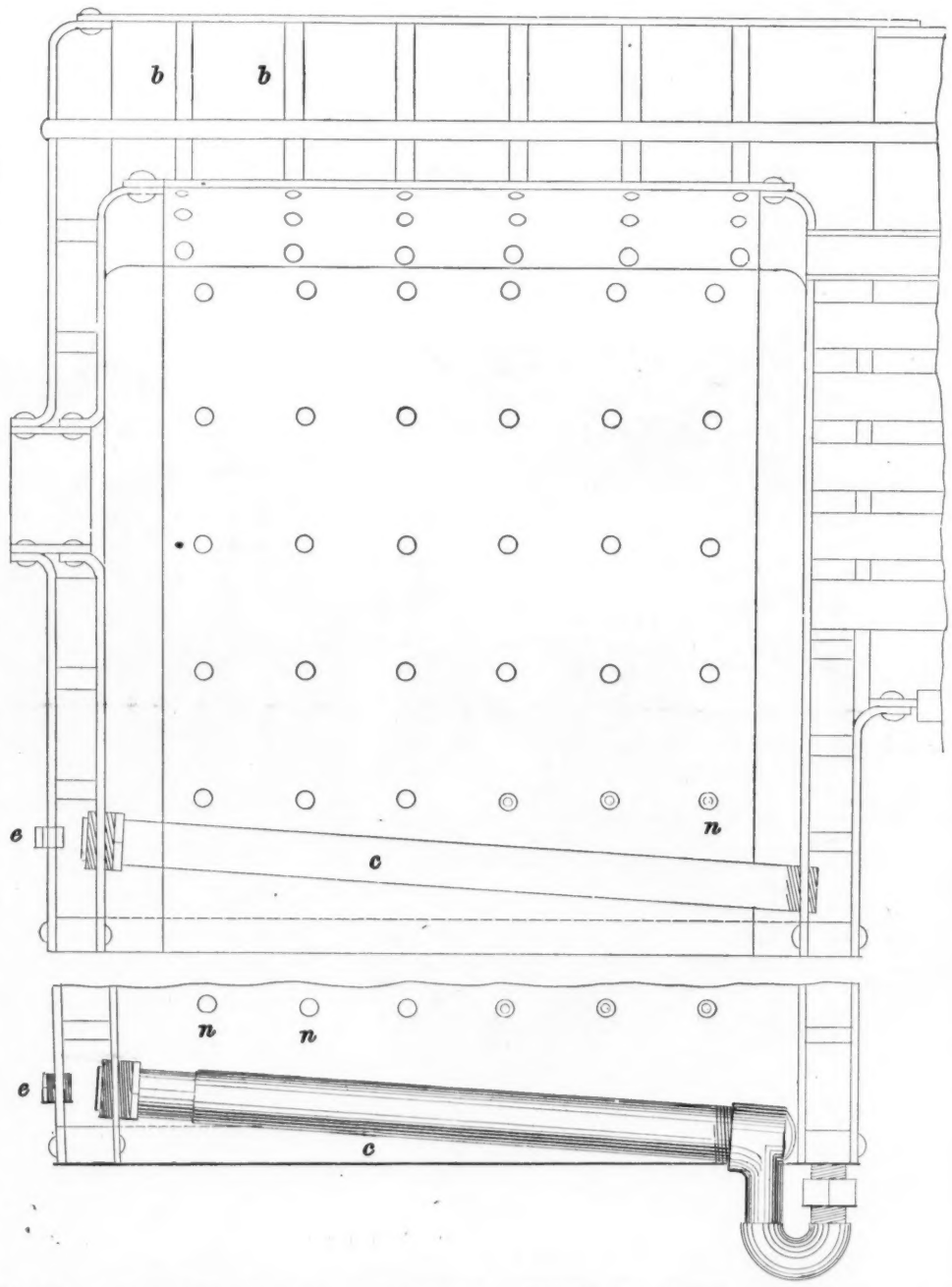
The question came down to a simple question of reducing the amount of work on the thing. The common Western plan of cheapening a product is to leave something off. They did this thing; they reduced everything and cut and slashed as long as they thought the machine would pass muster. Then they cut prices twenty per cent. Now, the Yankee manufacturers of this machine had never been well fixed, as they called it, for manufacturing; the last wind from the West began to hurt; something must be done with that machine. Did they think of reducing the value and cost of the thing by leaving some of the work off? They did nothing of the kind. The Yankee never takes that view of matters. They let the product alone and hopped upon the process and revolutionized it. They invested thirty thousand dollars in special machinery and commenced on a new lot of machines. The special machinery had been designed to do the work as well as possible, and when the lot was complete it was found that there was more profit in the work, at the last cut price, than there had ever been at any previous price.

They had kept about ten men on the work heretofore. The Western concern had about the same number. The East now cut the price ten per cent. more, intending at one swoop to kill their competitors, and enhance the demand for the machine.

They did so with this result: The Western men dropped the thing, saying they had done every thing that good mechanics could do in the matter, that the Yankees were working at a loss against which no good business-house could compete, and that it was entirely too sick a cat to get well. The new machines were so much nicer than the old ones that they were hardly recognized, and now over sixty men work on these machines.

* * * * Here is a case, Mr. Editor, where cut prices forced the use of the much-abused labor saving machinery, and where the much-abused labor saving machinery led to the permanent employment of twenty men in a new industry. I could write you down ten thousand instances of similar cases in this last particular.

* * Very respectfully, Chordal.



Details of a Simple Farm Engine.

BY F. G. WOODWARD.

The manner of applying grate tubes, referred to in the last article (March 10th issue), is represented by the above illustration. The upper figure shows a longitudinal section of the fire-box, in which the straight tubes *c*, are placed as shown. The lower figure shows another plan of applying these tubes. Both illustrations are plain and require no further explanation.

Beet sugar factories have been established in Maine and Delaware. Other factories of this kind are projected in New York, New Jersey, Maryland, Illinois and California. The beet sugar industry promises to be an important and profitable industry for farmers and others.

Capitalists from abroad have decided to invest $150,000 in a beet sugar manufactory at Quincy, Ill. The arrangements are nearly completed, and work, it is expected, will soon be commenced.

Boiler Proportion and Construction.—The Fire Tube Boiler in its Most Economical Form. Fuel and Durability.

BY WM. H. HOFFMANN.

Mr. E. D. Leavitt, Jr., who has built some of the best Compound Pumping Engines in the country, generally supplies them with steam, by one or more internally fired fire tube boilers of excellent design, though perhaps a little over-tubed, but otherwise, as far as heating surface is concerned, very near perfection. These boilers have, on the authority of well-known experts, given an evaporative duty equal to the best designed water-tube boilers. But with all this good record there is an important consideration here brought to our attention, viz., can they be readily cleaned at all points, and especially where the fire is fiercest, and are they as durable as the plain cylindrical tubular boiler fired under the shell?

The internally fired boiler with its important combustion chamber, is certainly in the best form for minimum loss by radiation—a form that cannot be reached in the matter of construction by the water-tube boiler, that type losing more by radiation than any other.

Where a boiler is constructed for internal firing, there are many places that cannot be cleaned with any degree of thoroughness, and the places most exposed are those where the fire is the hottest. Then, again, all the water below the grate and combustion chamber is without circulation, but it will receive just heat enough to deposit slowly all elements in the water that go to form scale.

But *with* these faults the internally fired fire-tube-boilers of the Leavitt design are far superior as to economy in every way to the water-tube boilers, unless the latter style is constructed with tubes over 5″ in diameter, and the joints are entirely outside of the fire chamber. Taking all things into consideration, we must arrive at the conclusion that the plain shell fire-tube boiler possesses advantages as to durability not equaled by any other system.

When properly designed and constructed it can be cleaned and inspected with comparative ease inside and outside, and when repairing is necessary at the shell and heads, these parts are easily reached, while the tubes can be replaced at a very small cost as relates to labor and loss of time.

An internally fired fire-tube boiler will give an evaporative duty of from 10 to 15 per cent. greater than a plain shell fire-tube boiler, both tested under the same conditions, but the life of the former will be 35 per cent. shorter than the latter.

The shells for all fire tube boilers should be as large as consistent with safety, at the ordinary working pressures, in order to expose as large an area of water level as possible, as this will help to prevent priming.

The combined tube opening should be no more than one-fifth the total grate area, and not less than one-eighth of the same. The tube opening should *never* with natural draught be subdivided more than sixty times, and fifty-four tubes will generally give the best results.

We should make the length of tubes *never* more than fifty diameters, and forty-eight diameters is a good standard for length.

As far as safety is concerned, the plain cylindrical fire tube boiler is not surpassed, as the records of boiler explosion will show upon investigation.

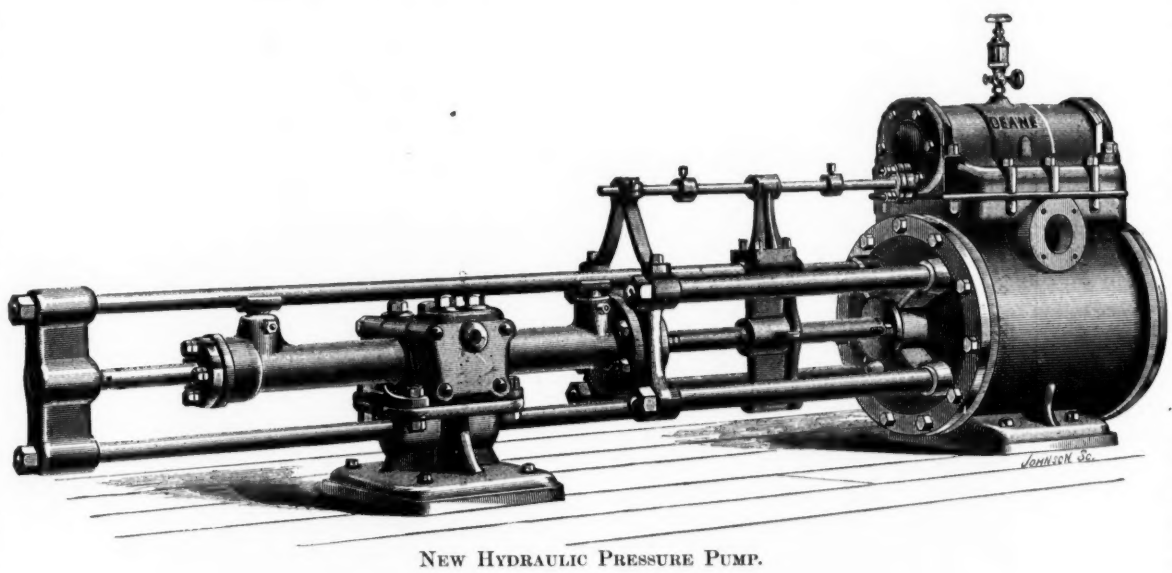
There are many of this style of boilers that have been in constant use for over twenty years, and they are safer to-day than several other kinds entirely new.

The writer will soon present for the readers of the American Machinist a few articles on the *water*-tube boiler, its past history, and its present condition.

Hydraulic Pressure Pump.

In the oil regions of Pennsylvania most or very nearly all of the transportation of oil is done through iron piping, which forms a sort of network in some vicinities. Recently an oil pipe line has been laid from what is known as the upper oil regions to Williamsport. This is called the tide-water line. A line has also been laid from the lower oil regions to Cleveland, Ohio. These are in successful operation, and another project is to lay a line to Buffalo, N.Y. It is probably only a matter of time when a line will be completed to Baltimore and Philadelphia, as the surveys have all been completed. In putting down these lines of pipe the greatest obstacle has been the difficulty of testing the sections so that they could be relied upon. The pump, which is shown in the accompanying illustration, was designed particularly for this purpose. The cylinder is 18″ in diameter, and 16″ stroke. The pump plungers are 2″ in diameter, and made of gun metal, as also the pump barrel and valve chests. The valve chests are provided with caps, so that the valves may be easily examined and repaired when necessary. The cross-heads are of cast iron and are connected by means of stout iron rods. The weight of both cross-heads and rods are supported by two adjustable bearings, which may be raised or lowered so as to preserve the alignment of the rods and plungers. The valve motion used is the same as that used on all the horizontal Deane pumps. A pressure of 3,000 lbs. can be generated by this pump, which pressure is said to be applied to each section of line pipe. Thus, by using this precaution, the risks incurred from loss of oil through leaks are very small.

These pumps are built by the Deane Steam Pump Co., Holyoke, Mass. Warerooms at 92 and 94 Liberty St., N. Y., John H. Harris, Manager.



New Hydraulic Pressure Pump.

Practical Draughting—Diagonal Scales—Decimal Scales.

BY T. P. PEMBERTON.

A "diagonal scale," giving the fractional parts of an inch in *twelfths*, can be constructed as follows: Draw seven horizontal parallel lines, and divide these by perpendicular lines into any number of equal spaces which may represent feet. From the middle point of the top line of the first division draw the diagonal lines which will intersect all the horizontal lines. Number the points of intersection, as 1, 2, 3, etc; and also the perpendicular lines, 1, 2, 3, etc; beginning on the the third perpendicular line to the right; the scale is then complete. This manner of making a scale is illustrated by

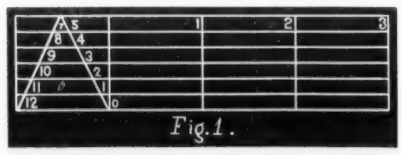


Fig. 1.

Fig. 1. Its dimensions are 2″x½″ (inches), but of course these can be enlarged and changed at pleasure. Reference being made to the diagram, it will be seen that the divisions made by the perpendicular lines 1, 2, 3, will stand for feet, and the divisions made by the diagonal lines will be twelfths of one foot or inches. One foot and one inch (figured on drawings 1′—1″) would be measured on the second horizontal line (counting from the bottom) from perpendicular line 1 to first intersection 1. Again three feet and six inches (3′—6″) would be measured from the extremity of the top line to the center of the first division containing the diagonal lines. In using a scale constructed in this manner, the dividers are required; and, therefore, it is not convenient for general use.

Referring back to "Practical Draughting Instruments," Fig 22 shows the reverse side of a plain, flat ivory or boxwood scale, found in many cases of drawing instruments.

It will be observed that two of these diagonal scales are given, and that the divisions are ten and not twelve in number. An enlarged view of this scale termed a decimal

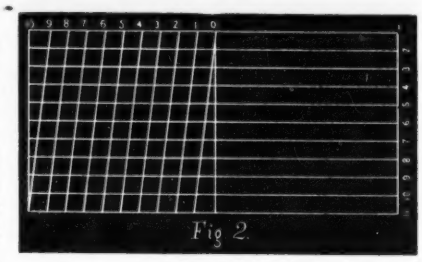


Fig 2.

scale is shown in Fig. 2. The "decimal diagonal scale" is constructed in a similar way to the former one, viz.: by the intersection of diagonal and horizontal lines. The diagram exhibits a decimal scale of one inch to the foot.

Draw eleven equidistant and parallel lines, forming ten spaces, and perpendicular lines for the foot divisions. Divide the first division into ten equal parts at the top and bottom lines and draw the diagonal lines, 0, 1, 2, 3, 4, etc. By this means the unit of measure is divided into 100 equal parts. Example:—If 1 foot and $\frac{5}{10}$″ (written 12.5″) were required, the points of the dividers would be placed on 1 and 5 on the top line. Again if 12.8″ were required, the points would be extended from 1 to the 8th diagonal. In like manner, for 12.4′, the dividers would embrace the top horizontal line and 4 diagonal; for 12.41″, the *second* horizontal line and 4 diagonal; for 12.42″, the *third* horizontal line and 4 diagonal; for 12.43″, the *fourth* horizontal line and 4 diagonal; for .5″, the top horizontal line, from 0 to 5 diagonal, etc. The student will note that the fractional parts are measured entirely on the *diagonal* part of the scale; the 12 inches (or one foot) being the unit of measure. On this same plain ivory scale will be found small simple scales (see representation of the "front side") ¼″, ½″, ¾″, 1″ for feet and inches.

The scales explained here besides others appearing on the same instrument are now seldom used.

Paper and boxwood scales with tenths and twelfths are easily procured and the divisions being brought to the edge, they are undoubtedly the best and most useful ones.

There is good reason for concluding that live cattle will soon no longer in considerable number be transported to Europe. The favorite form of exportation will be that of dressed beef in refrigerator steam-ships. It is claimed that meat thus sent, because of its age, is more juicy and tender than that obtained from a fresh killed animal. Then, too, the saving in freight is large, for dressed meat occupies only one-third of the space needed for cattle, which also are liable to meet with accident or contract disease.

The Pottstown, Pa., rolling mills have promised their workmen an advance in a few days.

International Exhibition of Steam Threshing Machines in Italy.

The Italian Minister of Agriculture, Industry, and Commerce, has decided on holding an international exhibition of small steam threshing machines in Perugia (Umbria). The following rules have been established: The exhibition will be opened on July 1, 1880. Constructors and merchants, either national or foreign, will be able to compete. Only those machines of from one to four horse power will be admitted. The prizes, to be bestowed by the Government, will be as follows: First prize, a gold medal. The Minister of Agriculture will purchase two of the threshing machines that carry off the first prize. Second prize, a silver medal. Purchase will be made of one machine that wins second prize. The committee award the following prizes: Third prize, a silver medal. Fourth prize, a bronze medal. Public experiments will be tried on the threshing machines under the direction of a commission. The competition will cease on July 20, 1880. Applications for admission must be made before May 31, 1880, and at the same time notice must be given of the space required, both as to length, breadth, and height, also the quality and quantity of fuel necessary for the respective machines must be stated. Each machine must be set in motion by the constructor himself or his representative, and the owner will be expected to engage a stoker and feeder for his machine. The constructors or proprietors of the machines, or their representatives, will bear all responsibitities incurred in the carriage and working of their machines, and will accompany them to the place where the experiments will be tried, and there set them in motion. They will also be expected to give any information the jury may request. None who will not accept these rules will be admitted. The grain threshed will be provided by the committee, but all other expenses incurred by the experiments will be borne by the competitors themselves. Information may be obtained of Signor Alessandro Raspi, Secretary to the Agrarian Committee, Perugia, Italy.

The Cultivation and Treatment of Fibres.

The cultivation of jute, ramie, flax and hemp, has hitherto been neglected in this country, though large quantities are consumed of the foreign article. The soil and climate of most States of the Union are well adapted to the cultivation of those fibres, and a profitable agricultural and manufacturing business could be established thereby. The production of machinery for manufacturing these fibres into useful fabrics is one of the promising mechanical industries that should be investigated.

The legislature of New Jersey has passed the following act, granting a bonus to successful cultivators of the above-named fibrous plants, which should be imitated by other States possessing like advantages for their growth:

Whereas, there are ample assurances that the soil and climate of this State are adapted to the cultivation of Jute, Ramie, Flax, Hemp and various other fibrous plants and grasses, which are extensively grown in other countries, and largely imported into the United States; and whereas, the development of new productive industries are of essential benefit to the public welfare; therefore.

1. Be it enacted *by the Senate and General Assembly of the State of New Jersey*, that with a view to stimulate individual effort in the cultivation of fibrous plants, that the Treasurer of this State be hereby authorized to pay the following bounties, upon vouchers duly receipted by the grower, setting forth the quantities and prices of the products grown by him or them, whose affidavit of their truthfulness shall be first affixed to the said vouchers, and be attested by the Clerk of the county in which the products are grown; and moreover, the said vouchers shall be certified by the chief of the Bureau of Labor and Industries of the State;

Jute.—For every ton of *two thousand pounds of Abutilon Avicennæ stalks* grown in New Jersey, not less than three feet long, *five dollars;* for every ton of *two thousand pounds* of what is known as *Rose, or Marshmallow*, not less than three feet long, and not more than one inch in diameter at the butt, *five dollars;* fractions of not less than a quarter ton in each case will be paid for at same rate; for every pound of marketable quality of *disintegrated Jute, two and a half cents.*

Ramie.—For every ton of *two thousand pounds of Ramie stalks* not less than *two and a half* feet long, *ten dollars;* fractions of not less than a quarter ton will be paid for at same rate; for every pound of *disintegrated Ramie* ready for combing, *five cents;* for every pound of *Ramie yarn* ready to *weave, ten cents.*

Flax.—For every ton of *two thousand pounds of Flax stalks for fibre* of the ordinary lengths, *seven dollars;* fractions of not less than a quarter ton will be paid for at same rate; for every pound of *decorticated or cleaned Flax* of first American quality, *three and a half cents.*

Hemp.—For every ton of *Hemp stalks of two thousand pounds*, of the ordinary lengths, *six dollars;* fractions of not less than a quarter ton will be paid for at same rate; for every pound of *decorticated* or *cleaned Hemp*, of best American quality, *three cents*; *provided*, that the bounties hereby authorized shall cease on the first day of April, one thousand eight hundred and eighty five; *and provided further*, that in no event shall the total amount expended in the form of bounties under this act, exceed the sum of fifteen thousand dollars, to be apportioned as follows: *five thousand dollars* to be awarded to the *enumerated stalks; five thousand dollars* to the *enumerated cleansed fibre*, and *five thousand dollars* to the *Ramie yarn.*

2. *And be it enacted*, that it shall be the duty of the Chief of the Bureau of Labor and Industries to certify the vouchers referred to in the first section of this act, and to have the general supervision, control and decision of all questions which may arise pursuant to the provisions of this act.

3. *And be it enacted*, that the Treasurer of this State is hereby authorized to pay any money in the treasury not otherwise appropriated, in pursuance of the provisions of this act.

4. *And be it enacted*, that this act shall take effect immediately.

To Clean Gun Barrels from Lead.—Pour in a little mercury, agitate it over the interior surface of the barrel and pour it out again. The mercury will amalgamate the lead and remove it.

Dealers in machinery inform us that they hear complaints from the Southern trade, of sharpers pretending to sell machinery. They get a purchaser to sign a blank ordering certain parts of machinery. The next thing the purchaser hears of the machinery is a note presented to him for say $500, written on the blank above his signature. It seems almost impossible to believe that such a fraud could be successfully practised, but we are assured that it is so.—*Boston Com. Bulletin.*

The wages of the iron moulders in the Bradley & Hubbard establishment, Meriden, Conn., have been advanced 7½ per cent.

It is stated that New York sugar refiners will give 1,000 of their employees a 10 per cent. advance in April.

Domes and Steam Boilers.

AN ADDRESS BEFORE THE SYRACUSE MECHANICAL ASSOCIATION.
BY E. M. GILSON.

I hold that if we subject water to the action of heat for the purpose of generating steam, that the steam is never any hotter, or dryer, as the term is generally used, than it is at the first moment of complete and final separation from the water, and that it should be kept as close to the body of water whence it came as possible until it passes out in whatever service is required. I will give the results of my own experience only, and deal with the setting and management of the common tubular boiler. Leaving out all details as to construction, except to say that in my opinion 12 feet is long enough for any boiler of this kind, using coal for fuel and without artificial draught with the ordinary three inch flue, a larger flue will require a greater length as it does not as readily part with its heat. With a large enough diameter of shell, and a proper distribution of grate surface, a 12 foot tube will deliver the gases to the stack at as low a temperature as can be approximated with profit to that of the steam in the boiler. Any increase of length after this result is accomplished is always attended with loss.

The boiler should hang on lugs, near both ends, to give a chance for perfect freedom of expansion. I have given a pitch of nearly 2 inches to a 12 foot boiler, and blocked the forward lug to hold the shell in place. This will not only cause the expansion to be all in one direction but will have a tendency to drive all sediment to the back end, which is lowest, where it can be easily blown out. I want plenty of grate or fire surface;

First, because it saves fuel by permitting slow and complete combustion.

Second, because it saves the boiler by giving the full amount of heat without confining it to any one point to its injury by overheating.

Third, because it saves labor to the fireman. Coal will not form in clinkers unless heated to a certain point, which is about a white heat, and not then unless exposed to sudden chill. A large grate surface will obviate all necessity either of crowding the fire to the melting point, or of resorting to the practice of excessive raking or cleaning which, as it is usually done, with the draught full on, forces combustion to the melting point, and leaves the fire in a condition where it speedily becomes more foul than before.

To secure these results, let us illustrate by supposing a boiler to be 4½ feet in diameter, 12 feet long. The fire-box should be slightly less in width than the diameter of shell, say 4 feet, and about the same proportion less in length, to the length of the boiler; 4½ feet will give 18 feet of grate surface, and 5 feet will give 20 feet of grate surface. In addition to this, I would leave a dead plate of at least 8 inches wide, extending across the entire front of the fire-box, and the same between the bridge wall and the end of the grate bars, for any kind of fuel. These plates may be perforated, if desired. The front plate will save coal, and the back plate will save the bridge wall. In firing any kind of soft or bituminous coal, I always place the green coal on the front dead-plate, and after it becomes slightly hardened by heat, or at the next firing, throw it back, which can be done by a few quick blows with a light scraper.

The advantage of this system of firing lies in the fact that the fire is always uniform. The hot coals at the back of the fire will burn all gases from green coal that pass over them, or make them hot enough to burn.

I have found that an air pipe, of about two inches in diameter, extending through the bridge wall, opening under the grate, will furnish oxygen enough to burn all these heated gases, and there will never be any of the dense black smoke so commonly seen issuing from chimneys. This represents so much fuel, and the fireman who can save it is sure of appreciation. With a fire-box constructed on this plan, and a fire run in this manner, there is no need of any formation of clinker; the coal will all be consumed to a fine ash that will readily drop through the grates by running a light hook under the fire. Never continue this process of raking until it looks all aglow in the ash pit, but stop when it is uniformly light all through.

Feeding the boiler is a very important point, and is commonly done in a very careless and wasteful manner. While the labor is uniform the water should be kept at as nearly a uniform height and temperature as

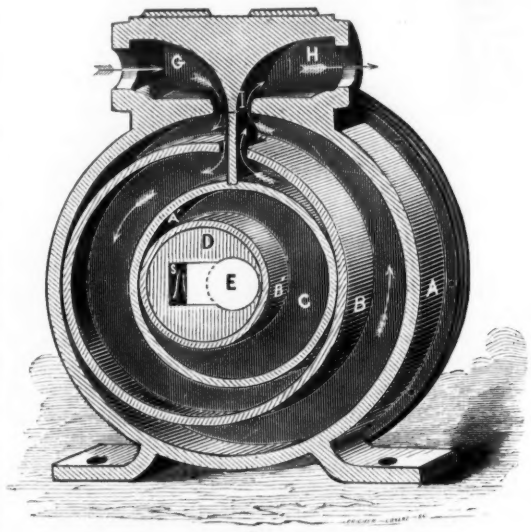


Fig. 1.

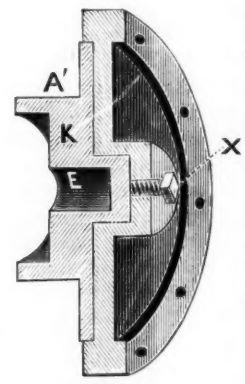


Fig. 2.

is possible. This not only requires steady firing, but a steady supply of water to take the place of that evaporated. The conditions are the same whether a heater is used or not. The latter case, however, aggravates the evil of sudden and severe changes in the temperature caused by starting or stopping the pump, and in the former case the heater is crippled, if not rendered useless.

The boiler should be fed at what is supposed to be its coldest point. This, in case of a

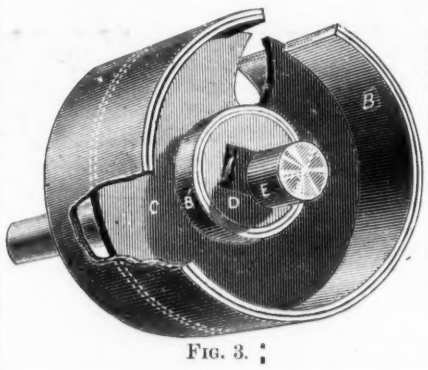


Fig. 3.

boiler, set as I have described, would be low down near the front head just over the dead plate. If the feed water is introduced at this point it cannot fall on over-heated sheets and it will diffuse itself through the boiler without undue exposure to any part.

After feed-water comes sediment, always; and to deal with this is one of the most perplexing questions that we have to meet in generating steam. I have endeavored to show how to set and run a boiler with the least possible expenditure of fuel, under ordinary conditions, that is without going into any elaborate and expensive details of construction. I believe that each of the rules given will be found to have some bearing in the solution of this question of sediment.

If steam can be generated by a given amount of heat distributed over sufficient surface to prevent any part of the boiler from becoming excessively heated, formation of scale will be to some extent prevented. I would use what is commonly called a "Surface blow-off." This should enter the boiler in the center of the front head and run back to the center of the dome or outlet, and should be large enough to give a sudden and complete outlet to any scum that may accumulate. By running this pipe to the point spoken of, the boiler may be completely freed from all floating impurities with the least expenditure of water.

I hold that a large proportion of the dangerous impurities deposited in process of making steam are first driven to the surface and can then be removed by surface blowing. Always use this pipe when the fires are going and the boiler is performing its accustomed service; it is almost useless at any other time.

The blow-off or mud valve can also be used with profit to prevent scaling. It will be noted that I said—set the back end of the boiler lowest. I have found that the impurities not caught by surface blowing will usually settle as soon as the fires are checked, and the water stops boiling, so I open my lower blow-cock before starting in the morning, and after the noon hour. I have used a 2-inch pipe, and found that 10 to 15 seconds was long enough to hold it open, twice each day. By using the surface pipe one hour before stopping and the mud pipe before starting, in the manner indicated, there will be very few impurities left in the water, and consequently very little scale will form.

I do not favor the practice of blowing off boilers every week for the purpose of feeling about in them with a scraper, and removing a few pieces of scales which is about all that is commonly done. A boiler full of water that has been well heated to the steaming point is worth much more than so much water that has never deposited its impurities, to say nothing of its difference in temperature, which represents so much fuel, and to throw it away for the insufficient reasons that can be usually given is wasteful. If a boiler is properly set in the distribution of its heating surface and then properly managed, there should be very little trouble from scale with any of the water we have to contend with.

HALF SIZE.

Combined Alligator and Monkey Wrench.

The employes at the Keystone Bridge Works, Pittsburgh, have received an advance of 20 cents per day.

The section men of the Syracuse and Oswego Railroad, at the south end of the line, have struck for increased wages. They have received ninety cents and ask for one dollar a day.

Lindsay's Oscillating Rotary Pump.

We present herewith engravings of an ingenious yet simple, effective and durable pump capable of handling large quantities of liquid and which has proved very effective as a fire engine.

The piston is a metallic ring oscillated between the shell A, Fig. 1, 2 and 3, and the hub A′ by the eccentric D.

Its principal features are: it can be run at low or high speed, in either case producing a constant, practical vacuum for drafting; contains no lodging places for tan, corn, or other obstructives; will operate equally well running in either direction, or in any position, and requires no special skill to manage it. The wear has been found to be so slight that after two or three years of daily service in tanneries the only repairs needed was the refitting of the eccentric. Another noticeable feature in the construction is the absence of valves, wings, or packing of any kind, and consequently, absence of liability to be injured or obstructed by either hot or viscous liquids.

In manufactories where water power is used this pump has exhibited special merit as a fire apparatus. It is manufactured by J. M. Mason & Co., Boston, Mass.

A New Combination Wrench.

It would seem that about every practicable form (and some impracticable) of a wrench had already been tried, but here we have something novel and commendable in the way of a combination wrench that promises to win popular approval. It not only combines all the qualities of the Alligator or pipe wrench, but also contains all the requisites of a regular nut wrench. It is made of cast steel, with case hardened jaw, and takes from ⅜ to ¾-inch pipe, and ½ to 1 inch round iron. The efficiency of neither form of wrench is sacrificed to make the combination tool, and durability as well as convenience seems to be secured. The manufacturer is Curran Dinsmore, 5 Dey St., New York.

Brown Tint for Iron and Steel.—Dissolve in four parts of water, two parts of crystallized chloride of iron, two parts of chloride of antimony, and one part of gallic acid, and apply the solution with a sponge or cloth to the article, and dry it in the air. Repeat this any number of times, according to the depth of color which it is desired to produce. Wash with water and dry, and finally rub the articles over with boiled linseed oil. The metal thus receives a brown tint, and resists moisture. The chloride of antimony should be as little as possible.

Letters from Practical Men.

SECURITY FOR WORKMEN'S SAVINGS.

Editor American Machinist:

We appreciate the kindly spirit in which Mr. Tallant notices a former letter. We think he slightly misunderstands us, though our comments were grounded upon "Chordal's" letters. Amongst the many good things found in the American Machinist we always turn first to Chordal's letters and digest them thoroughly. They contain some solid good sense. His advice to working men is worth jewels. Our aim in that letter was to point out the fact "that working-men had no surety for their savings." The United States Government will provide him bonds, when he has reached the sum of $500; but I presume Mr. Tallant knows the great difficulty a working-man has to save his first $1,000. That point reached he is safe; the road to a competency is easy.

I recognize the fact that the columns of the American Machinist are too valuable for such purposes, or we could a tale unfold of the rottenness and roguery by which the workmen of this city lost their savings. It was not by strictly business reverses; but by fraud and positive stealing.

The banker that Mr. Tallant speaks of, was a case of domestic rather than of finan-

cial difficulty. We regret that Mr. T. failed to see the point we were aiming at, for it is the discussion of just such subjects as these, so beneficial to us working-men, that makes the AMERICAN MACHINIST of so much practical interest.

Now here comes Chordal again—giving us just the advice asked for. His idea is a wrinkle, that we can rub in pretty hard. When Mr. Sherman will place $100,000,000 in $50 and $100 bonds, then we shall see workmen investing in them. They care not for a big interest. Give them a safe place to invest in, until chances offer to better themselves, and we shall find they know how to make the best of their money. When I wrote the former letter I was using the argument so often used by workmen who had lost from $250 to $700 in these busted banks. "Its no use putting money in savings banks; the directors and President save it all, and salt it down."

The new rules for admission to the Mechanical Engineers' Society are condemned by some good engineers. A young man, a graduate of a technical school, who has patented and owns some valuable inventions, speaking of them, says, "They will kill the usefulness of the organization; none but professionals and experts (schoolmen) will seek to enter such a society."

Respectfully Yours,
Chicago, Ill. NORMAN.

THROTTLING GOVERNORS.

Editor American Machinist:

In your paper for March 13th, Mr. Roper cites a case in which an ordinary slide valve engine with throttling governor did better without the governor than with it. It is a fact well known to engineers that the ordinary throttling governor robs the steam of some 20 per cent. of its force by wire drawing, etc.

Yours,
FRANK C. SMITH.
Delaware, O.

IRREGULARITIES OF TEXT BOOKS.

Editor American Machinist:

After thinking four days over the matter I have come to the conclusion that I am sorry that I said anything against the vagaries of text books, in so far as I have given unnecessary alarm to any one. I do not think it necessary to defend what I wrote for two reasons—one being that I avoid even the appearance of controversy; secondly, it seems to my mind that I am correct.

I desire to thank the gentleman who so kindly and at length noticed my article, for remarking a mistake of mine in relation to the tensile strength of a rod one-inch in diameter. I had in mind forty thousand pounds when I wrote, but I made it tons. I do not believe a rod one inch in diameter will sustain forty tons.

Yours truly,
EGBERT P. WATSON.
Stockbridge, Mass.

CUTTING SCREW THREADS.

Editor American Machinist:

In your issue of Feb. 21, headed "Cutting Screw Threads in a Lathe," by J. E. McConnell, who gives, as he says, some "plain, practical directions," that they are plain, there is no doubt, but I fail to see the practical part. In cutting a double thread where you have to throw the whole lathe out of gear, I should think that a machinist might arrange it so as to turn the work half way around. If he had many to cut, the expense of cutting an extra slot in the face-plate would be less than counting teeth on gear. Cutting threads on a lathe, which has no reversing belt, is not practical, but, if it should be necessary to do so (unless he has a very long thread), he can run the lathe back by hand much quicker than he can drop the nut and then run the carriage back by hand, with the aid of all the chalk marks he has. They do no injury, and I don't know as there is any harm in making them, providing you have plenty of time. His directions for determining what gears to use are practical, but all the others are perfectly plain.

Worcester, Mass. E. H. REED.

LOCOMOTIVE CROWN BARS AND BRACES.

Editor American Machinist:

In your issue of March 20th, Mr. Wm. H. Hoffman, of Passaic, N. J., has been kind enough to give us his views on the subject of "crown bars," and crown bar braces of locomotive steam boilers.

In the first place Mr. H. remarks: "I do not believe in crown bars, for the reason that they displace too much water where the greatest amount of water is absolutely needed. The result of this water displacement is the shortening of the life of crown sheets, and a falling off of evaporative power. * * * * I have seen many boilers where there was so little space between the under side of crown bars and the top of crown sheets that the signs of burning were noticeable at a glance."

Every competent engineer knows how desirable it is to have the crown sheet as little obstructed by crown bars, braces, etc., as is consistent with the necessary support to sustain it under steam pressure. The spacing of the points of support will be determined, mainly, by considerations having reference to the thickness of the crown sheet, and the steam pressure to be carried. The selection of these points of support will have no reference to the kind of brace or crown bar from which support is obtained, only, provided always, that the *necessary support is obtained.*

Judicious engineering would aim, first, to obtain the supports of proper proportions and dimensions to secure the necessary strength, and, second, to so dispose them as to obstruct, as little as possible, the circulation of the water and the escape of the steam; third, such an arrangement as would admit of the parts of the boiler freely assuming such variations, in form and dimensions, due to variations of temperature without producing injurious deflections or destructive strains. All of these desirable qualities are within the compass of engineering skill, and when they are obtained, the durability and the evaporative capacity of the crown sheet will be impaired to the smallest extent possible under the circumstances.

I will readily concede that Mr. Hoffman "may have seen boilers where there was so little space between the under side of crown bars and top of crown sheets that the sign of burning was noticeable at a glance." Even Mr. Hoffman's own language implies that these boilers were very injudicious constructions. They are, therefore, justly chargeable accordingly. Such instances of malconstruction do not warrant us in condemning the use of crown bars. On the contrary, they should instruct us in making a judicious arrangement of them.

In regard to vertical braces connecting the crown bars with the shell, all will concede that the object sought to be accomplished is the holding up of the crown bars, and that if the braces accomplish this, they would sustain a tensile strain only, without any tendency to "buckle."

In referring to such braces Mr. H. remarks: "My idea of staying a crown sheet is to connect it to the proposed T iron rafters riveted to the shell, by thin and wide steel stay rods. * * * If these stays are thin and of steel they will not resist the compressive strain due to expansion, but will buckle enough without injury to them to allow for this expansion, and the crown sheet will not be necessarily depressed at all."

I must remind Mr. H. that the braces he has, in this instance, described are only ideal creations of his, and are very different things from those in use in actual practice, the latter only are justly involved in this discussion.

After having made calculations in regard to the expansion, &c., of the inside and outside sheets, Mr. H was unable to come to any other conclusion than that the braces ordinarily used were subjected to a compressive strain, or, in other words, that each of such braces constituted a strut between the crown bars and shell of the boiler, and with all the force arising from the difference in the expansion of the inside and outside sheets, tending to force the shell outwards and the crown bars downwards; hence his suggestion of the use of a form of brace that would "buckle." If such braces are required to buckle, it is the most reliable evidence we have that they cannot accomplish the purpose for which they were designed, and that, consequently, they are in nearly every instance, positively, more or less injurious.

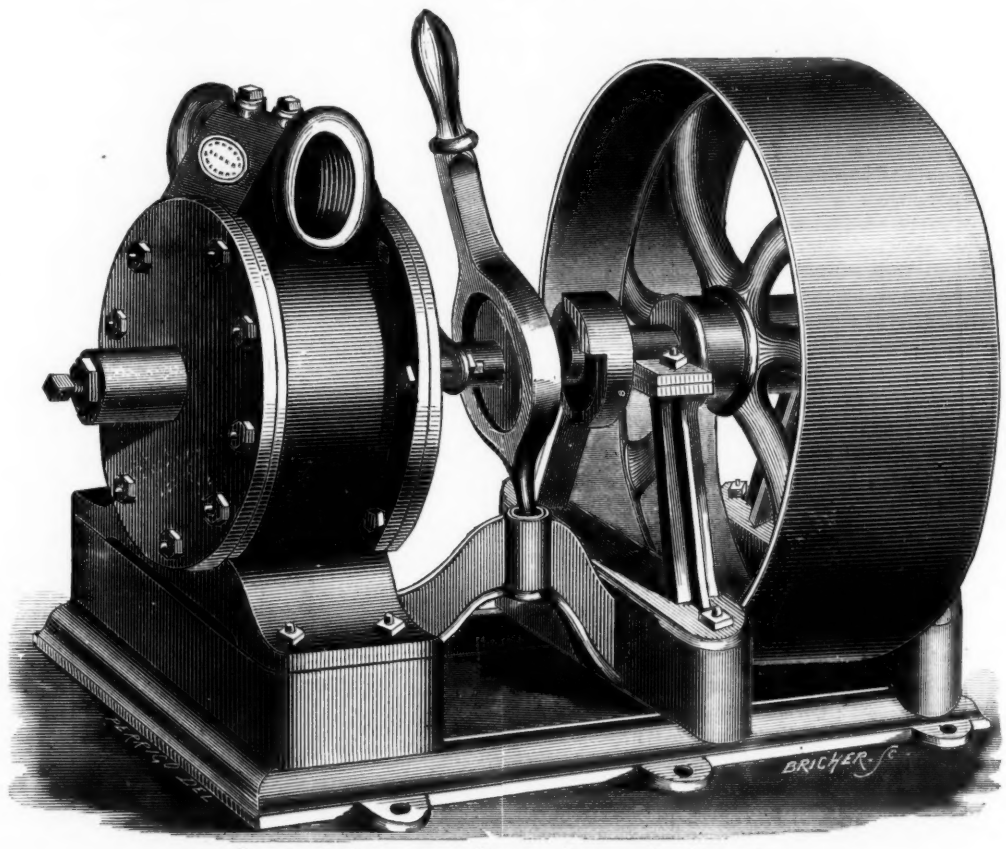
In the latter part of Mr. Hoffman's letter he says: "I fear he will never be able to convince me that the proper thing to do in that line is to *fill in the space* over the crown sheet with crown bars." In the early part of this letter I refer to such considerations as would determine the location of the points of support for the crown sheet; if in that I am correct, it will be seen that the presence or absence of any auxiliary bracing will in no way change either the number or location of the crown bars, consequently the space over the crown sheet need not be *filled in with crown bars.*

The chief merit of crown bars, only as a support for the crown sheet, consists in their admitting the variations in form and dimensions due to variations of temperature freely, without involving any injurious deflections or destructive strains upon any part of the boiler.

The relative variations in form and dimensions of the different parts of steam boilers due to variations in temperature, &c, and the influence of this in producing destructive deflections and strains, has, up to the present time, received attention only of a limited number of engineers, and to this fact is due, more than to any other, the introduction of useless and injurious bracing and the too general absence of the quality of flexibility, or the ability of every part to submit to the unavoidable variations of temperature, independent of and without producing injurious strains upon other parts.

It is time now that engineers become alive to this fact; this alone will enable them in the future to correct those imperfections in the design and construction, to which is justly chargeable nearly every boiler explosion that has yet taken place.

I hope to again have the pleasure of hearing from Mr. Hoffman and others on this important subject. W. H. THOMPSON.
Cleveland, Ohio, March 25th, 1880.



LINDSAY'S OSCILLATING ROTARY PUMP.—SEE PAGE 4

DIAMETERS AND NUMBER OF TEETH FOR GEAR WHEELS.

Editor American Machinist:

The first three rules given by T. W. R. McCabe, on pages 4 and 5, Vol. 3, No. 12, would seem to indicate that the writer had conceived a new theory of toothed wheels. Up to the present time, all authorities have agreed that the numbers of teeth in wheels working together should be to each other as the diameters were to each other, and that, therefore, the number of teeth in a wheel should be to the diameter of the wheel as the number of teeth in its pinion is to the diameter of the pinion. I quote the following rule and example from Haswell. Strange to say, the example is the same selected by Mr. McCabe, but the result is different, being arrived at by a correct rule.

"To compute the diameter of a pinion, when the diameter of the wheel and number of teeth in the wheel and pinion are given:

"RULE.—Multiply the diameter of wheel by the number of teeth in the pinion, and divide the product by the number of teeth in the wheel.

"EXAMPLE. — The diameter of wheel is 25 inches, the number of its teeth 210, and the number of teeth in the pinion 30; what is the diameter of the pinion?

$$\frac{25 \times 30}{210} = 3.57,"$$

not 3.7102, as by Mr. McCabe's rule. His rules, in fact, will not even work together, "Rule 1" and "Example 2" (which is correct), being inconsistent.

I would say here that the velocities of toothed wheels should never be calculated from measurements made of their diameter, for, in the first place, the exact location of the pitch line being unknown, a measurement cannot be accurately made, and, in the second place, the number of teeth may not correspond with the diameter, in fact, never would, if in accordance with Mr. McCabe's "Rule 1." Therefore, the above alluded to inconsistency. Respectfully,

New York, March 30. HUNTING COG.

The Principal of a public school in Newark, N. J., having to keep a record of temperature, height of barometer, and pressure of steam in the boiler used for heating the building, added to his table a fourth column headed "the mean," obtained by adding together these items at each observation and dividing the sum by three!

One of the novelties of Breslau is a paper chimney, about fifty feet high, rendered fire proof by chemical treatment.

Vertical Engines.

During the past few years there has been a constantly increasing desire among manufacturers to secure an efficient and durable steam engine which would possess the greatest advantages.

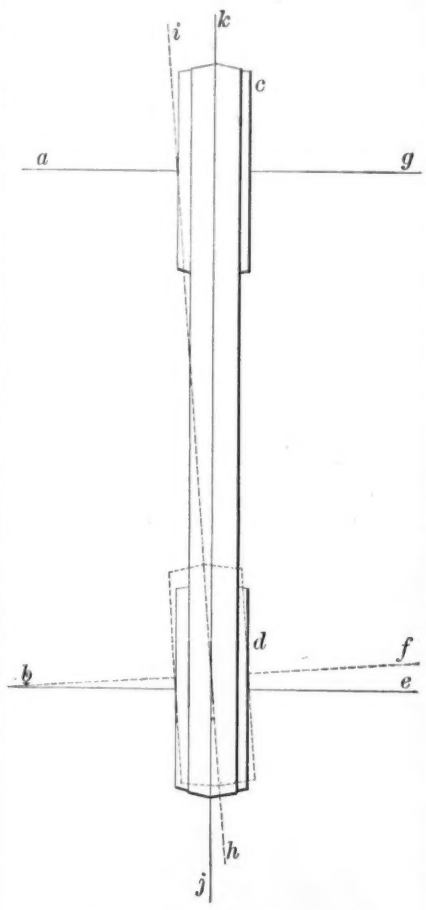
The vertical engine seems to have developed more points of superiority than any other, for the following reasons. It occupies the least floor space. The design is very simple, and the frame, though possessing great strength, is of such a design that the least amount of material is used to secure that end. A heavy, bungling frame is thus avoided, and the engine has instead a neat and shapely appearance. The frame also encloses the working parts of the engine, which protects them from injury, and also prevents the accidents which frequently happen to persons who come in contact with the moving parts of horizontal engines. Access to all parts is readily attained for inspection or repairs. As the working parts all move vertically there is consequently an equal amount of wear upon all sides of each part; besides, the friction is greatly reduced. On account of its simplicity, the price is much less than of a horizontal engine which will develop the same power. This is an important advantage to say nothing of the small amount of labor required to set them up. The lubrication is necessarily more perfect upon a vertical engine than upon any other.

Vertical engines are not only adapted to light work, but are also used for the driving and rolling mills and blast furnaces, as well as the largest steamers. We illustrate herewith a vertical steam engine which is built by the New York Safety Steam Power Company. This engine is known as an independent or double crank, vertical engine.

It will be observed that there are two bearings for the crank-shaft, both of which are cast solid with the frame. The guides form a part of the frame, and are bored out when the top of the frame is faced off for the reception of the cylinder, consequently there can be no derangement of lines, and the friction is equally distributed. The shaft bearings are large, and present a large wearing surface, as well as ensuring great strength. The piston-rod is of steel, as is also the cross-head pin, which is lubricated through a hole in the center. The connecting rod is solid. The end connecting with the cross-head is furnished with best composition boxes, while the crank-pin bearing is composition-lined with babbitt metal. The valve which admits steam to the cylinder is of the plain slide description. The valve-rod, which is of steel, passes through both sides of the steam chest, thus leaving the valve perfectly free. There is no thread upon the valve-stem, but a block of composition, with a set screw, is used instead. The joints and general workmanship are excellent. There is no oil or dirt thrown upon the floor from these engines. Each part is made to fit a gauge, therefore they are interchangeable. A number of the same class are built at the same time, which greatly reduces the cost of production. They are not only well made, but are nicely finished. In operation, they are virtually noiseless. During the past ten years, over one thousand have been put into use. These engines are made in sizes from two to twelve horse power. Salesrooms of the New York Safety Steam Power Co., are at 30 Cortlandt St., New York. E. T. Copeland, General Agent.

The beet sugar buildings, Franklin, Mass., will cover nearly an acre of ground. The main building is to be built of brick, and will be 72 feet square and 40 feet high; sugar curing house, 82 feet long, 40 feet wide, and 30 high; beet house, 100 feet long, 50 wide, 13 high; pulp house, 40 feet square, 30 high; bone-black house, 72 feet long, 37 wide, 30 high; boiler house, 61 feet long, 37 wide; lime kiln, 36 feet square, 30 feet high.

Parnassus, a town in Westmoreland County, Pa., offers a large tract of land and some capital to any manufacturer who will locate there.



Running Conditions of Belts.

BY L. F. LYNE.

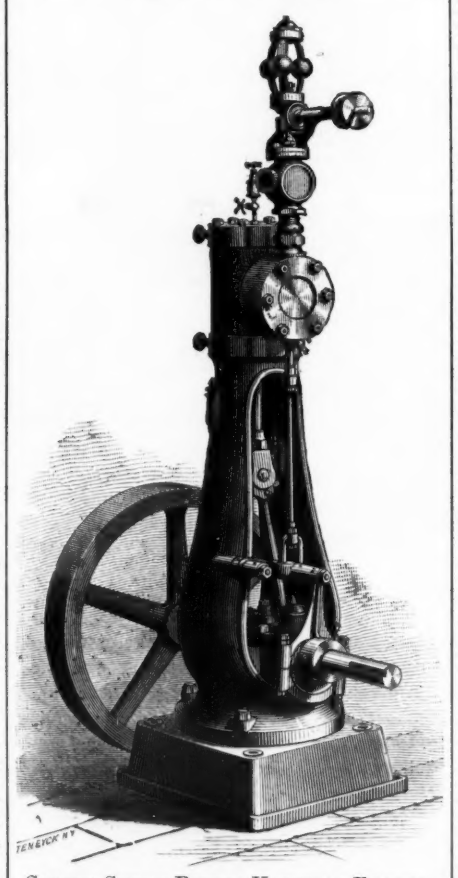
"Will a belt run towards the high side of a pulley?" This question has been often asked, and probably eight out of every ten men will answer in the affirmative. This query is among the first which is put to apprentices upon entering the shop, and they are taught by journeymen mechanics that the affirmative answer is correct. Most of the books that treat on the subject of belting contain the same statement. Other good writers have also very recently fallen into the same error. The AMERICAN MACHINIST has received inquiries in relation to the same, and it is my purpose here to explain the practical workings of a belt under certain conditions, showing that the term "high side" is a very indefinite expression. Referring to the accompanying illustration, we will suppose that *a* and *b* represent two parallel lines of shafting, upon which are placed two "crowned," or high-faced pulleys, *c*, *d*. The center lines of these pulleys coincide with each other, as indicated by the line *j*, *k*. If the belt be placed upon either edge of both pulleys, and motion communicated to them, the belt will run up to and over the highest part of the pulleys, equalizing itself upon both sides of the center. This also proves that if the two pulleys were turned conical shape, and the two large diameters were placed towards the same ends of the shafting (as *a*, *b*,) and the belt placed upon the smallest sides, the belt would then climb to the highest part and run off at the largest side of the pulleys, toward *e*, *g*.

We will now suppose that a belt be placed upon two pulleys with high faces, as in the first instance, and the end *e*, of one line shaft be moved toward the other, as shown by the dotted line *f*. It will be observed that this does not move the center of the pulley to one side as might be supposed. The conditions are now changed, and the belt, instead of running toward the end of the shaft *b* (as most men will assert), will be inclined toward the opposite end *f*. The reader will notice that the belt will run towards those ends of shafting which are nearest together.

The cause of this may be easily explained. It is owing to the fact that the center line of motion of the pulley *d*, has been disturbed, and instead of coinciding with the center of the pulley *c*, will occupy the position shown by the dotted line *h*, *i*. We will now suppose that the upper part of the pulleys are made to revolve towards *j*. The center line of the belt will be received upon the center of the face of pulley *d*, and, owing to the angularity of the same, the belt will be carried towards *h*. The force referred to, which has a tendency to throw the belt off the pulley, gradually grows less, until it reaches the center line of the two lines *a*, and *b*. From that point to where it leaves the pulley, the same force has a tendency to draw the belt back towards *b*. This partly rectifies the fault, or in other words—if the belt should leave the face of the pulley at the center line of the two lines *a*, and *b*, the belt would not run upon the face of the pulley at all, as there would then be no force acting to keep it there. The belt is inclined to run very near the center of the pulley *c*, for the reason that the center line of motion of that pulley has not been disturbed, and still coincides with the center of the pulley *d*. Now if the end *g*, of the shaft *a*, be moved toward *e*, corresponding to the distance from *e*, to *f*, the center lines of the two pulleys will cross each other just half way between *a*, and *b*. The belt will then run equally upon both pulleys towards *e*, and *g*.

The belt always in practice runs towards the ends of the line shafting which are nearest together.

The shafting may revolve in either direction without changing the result. The same law holds good with either straight or high faced pulleys. If the highest part of a pulley be to one side of the center (as is sometimes the case through faulty workmanship) the belt will follow the high part, provided that the shafting is parallel. A belt will keep its position upon high faced pulleys better than upon straight faced, until it is overloaded and begins to slip, when it will be found that the high face will push the belt off to one side.



SAFETY STEAM POWER VERTICAL ENGINE.

This is owing to the fact that just as soon as the belt begins to slip one side of the high face of the pulley gets a little advantage over the other, consequently the belt will be thrown off from that side. The question of a belt running towards the high side of a pulley has been the subject of much discussion, and probably will continue so until the theoretical skeptic will submit to the results of some experiments which will occupy only a few minutes' time, and will demonstrate the truth of these statements.

A sugar mill to weigh 300,000 pounds, including a heavy and superior made 300-horse power engine will, it is said, be soon erected in Louisiana. It will rank among the largest establishments of the kind in the world. Its cost of machinery will enable it to gain on the productions of ordinary mills, thirty per cent. and more.

Referring to the Cohoes strike, the Troy *Press* says: What has been gained by the strike beside the nominal advance in wages and the fifty minutes for dinner is the respect that henceforth the Harmony mill owners will necessarily feel for the operatives. Heretofore the hands in the mills have been mere vassals in their estimation. Hereafter they must consider them as reasonable and reasoning human beings. The strikers in this instance have behaved finely. There has been no bluster, no threats, but a quiet determination to enforce their just demands. The fifty minutes nooning is in reality an hour for rest, for the wheels of the mills are to be stopped fifty minutes and it takes nearly or quite ten minutes to get on full speed after starting."

The wages of the employees in the warp mill, Holyoke, Mass., were advanced 10 per cent. March 1st, without solicitation.

Gleanings from the Foreign Press.

POLISHING AND FINISHING METALS.

Forge and Lathe gives the following directions for finishing and polishing steel and iron. Take, for instance, a surface of steel as an example—the square stem of a drilling instrument will form a very good subject. After it is roughed out, and the work all done, it must be draw-filed, and this must be done with a superfine Lancashire file, and the lines must be kept quite straight, otherwise it will require so much emery-paper that the edges will lose the sharp angles which are the beauty of the work. Any ordinary workman can rub away with emery-paper, but in so doing he may spoil the appearance of a piece of good work, and that without knowing it. To avoid this, the smoother and better it is filed the less paper will it require. To get the beautiful finish we see on the best work, a piece of flour emery-paper, well worn, and a little oil upon it, will be found the best thing to use, and when this has been well worked, to get the high polish, a piece of wood flat upon the surface, with some fine crocus, will bring it up to this state; and if any deep scratches be there, you will at once observe them, and to remove them, in all probability, it will have to be filed over again. Now, to avoid all this loss of time, great care must be taken that the scratches are removed before any attempt is made to polish. Having finished the work so far, many prefer to see it left straight; others, again, like to see it in some way ornamented. Now, there are several ways of doing this. First, then to cross the surface. This is done by folding a piece of emery-paper tightly round a file, but the process is not the merely pushing it across the work and making a mark, but it requires some practice to produce a good pattern, and the wrist must take a kind of circular action, and by doing this each line becomes, so to speak, connected, and makes a much better finish than a series of lines only. Another process of finishing steel is to curl all over the surface with a piece of oil-stone that will cut. This is a most difficult thing to obtain, as very few stones will cut steel to leave the bright marks necessary to give it the appearance desired. When a piece of this is once obtained it is really a prize, and if it wears away it may be inserted as far as possible into a wooden handle. To use the stone when it is once obtained is the next thing. This is done by holding it firmly in the hand and moving it about in all directions, like curling brass. There is no stated number or size of the curl, but this is quite a matter of taste, and must be left to the operator. Another way of finishing iron and steel is with the scraper, which is used with both hands, and the work must be scraped in various directions, but with regularity. Large surfaces are sometimes done in this way. Lathe beds are at times done so, but we think this is somewhat out of character, as the fact of continually drawing the poppit head up and down the bed produces a series of lines which look most unsightly. Regarding all this it is all a matter of taste, and the style of finish must be left to the operator.

WELDING CAST STEEL.

A writer in the *English Mechanic* answers the question, Can cast steel be successfully welded?

Yes, it can, as far as welding goes, but the success depends on the use it is put to after. For cutting tools or rods for machinery no use whatever. For welding into iron for bricklayers' chisels, digging forks, and similar tools it answers very well. I have had practical experience in each case, but remember nothing but practice will give the required results whatever the flux used. What I use is 10 parts of borax to 1 of sal-ammoniac fused together in a sheet-iron pan, and when cool crushed fine and used as sand. Or 2 parts of borax to 1 of saltspernella with sand process as above. Now prepare to weld, having the anvil in a close and convenient position. 1st. Upset the ends to be welded, and have plenty of stuff to work upon and scarf a little longer than for iron; if more than one, prepare them all in this way first, as you can keep the color of the heat better in your eye when welding close one after the other. 2d. Blow up a nice clear fire, free from sulphur as possible, and heat the pieces to a peculiar yellow, then dip in flux lightly and heat till you see it flow, and it becomes a light yellow without sparkling. 3. Take out and stick with a light sharp blow, and follow up with quick sharp blows (not heavy); if the scarves are not buried pene over, take light heat, and work to proper size.

HARDENING STEEL CUTTERS.

A correspondent of the *English Mechanic* says: I have had a good deal of experience in hardening cutters of all sizes, say from the size of a fourpenny bit to five inches in diameter, and since I got this recipe I have hardened fifty cutters without even spoiling one, and I used to spoil two out of three. Imagine, after spending a whole day in making a cutter, doing your best to it, it is very galling to find it split right across when you take it out of the water. I got a recipe from an old man who was going about the country sharpening saws, and I have great pleasure in giving it for the benefit of the subscribers. Take a bucketful of clean water, and add one gill of vitriol; stir up well, and bottle for use. This will last for years if kept corked up; only when using it, put your cutter on the top of a piece of sheet iron, and when properly red drop into the liquor. This, when taken out, will be as hard as flint. Blaze, and let down to a purple for cast steel. This has never failed in one single case out of fifty.

BOILER EXPLOSIONS.

If no attempt is made to check these disasters, says *Iron*, the destruction of life that will have to be added up at the end of the year will be something frightful. Last year there were about fifty steam-boiler explosions, by which forty persons were killed and about as many injured. The death-list from this cause during the last decennial period numbers 700, with more than double more or less seriously injured, and there is nothing to prevent the continuance and increase of this class of preventable accidents. Ministers have been urged repeatedly to institute some system of enforced inspection, which would probably reduce these casualties to a minimum, as they generally arise from wear and tear or some other cause equally evident and equally remediable but without effect. It is a very serious thing that any man may fill a building with improperly-constructed or worn out boilers in the neighborhood of a crowded thoroughfare, with no law to prevent him, or to punish him after he has blown up a score or two of his workmen or neighbors; and it is a significant commentary on all this that the boiler at the Glasgow Ironworks, which collapsed on Friday last and killed about thirty people, three of them on the spot, was neither insured nor subjected to periodical inspection.

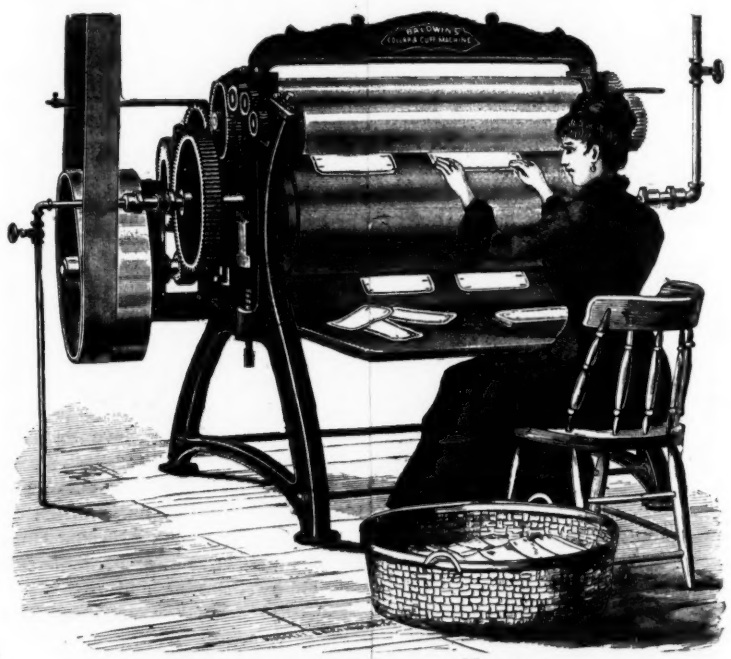
NEW TRAMWAY LOCOMOTIVE.

A new tramway locomotive was tried in Liverpool recently, says the *Universal Engineer*. It resembles an ordinary car, the boiler and machinery of the motor being inclosed, and the chimney projecting about 4 feet above the roof. The engine is of 10 horse-power, working at a pressure of 70 lbs., and is said to be capable of ascending a gradient of 1 in 14, drawing a car containing 50 persons. The engine weighs 5 tons, and runs on four coupled wheels; but adhesion is gained by making the wheels of the car into a bogie placed near one end, while the other rests on the frame of the engine. One man controls the locomotive power, and the speed is limited to eight miles an hour.

White Shellac.—To make white shellac varnish dissolve one-part pearl-ash in about eight parts water; add one part shellac, and heat the whole to the boiling point. When the lac is dissolved, cool the solution, and saturate it with chlorine until the lac has all settled. When it is dissolved in alcohol, it forms a varnish which is as transparent as any copal varnish.—*Fortsch. der Zeit.*

Improved Laundry Machinery.

The machine herewith illustrated is a successful laundry device for ironing collars and cuffs by means of steam heat. The cut will explain the general operation of the machine. All pieces are turned out dry. The damp often noticed upon steamboat and hotel linen is owing to the fact that pressure alone is used without heat in machine ironing. The old English box and the wooden mangle, upon which Mr. Mantalini performed his "demnition grind," are by no means out of date. The machine shown in the cut has one large heated ironing cylinder, and three small felt-covered rollers pressing upon it.



Collar and Cuff Ironing Machine.

The first smooths and dries, while the small rolls also take up moisture, which is again evaporated as they turn and return upon the heated cylinder.

The lace curtain hot box is a neat arrangement.

A frame is laid across horses, the curtain stretched into shape thereon, and the frame slid into the box, which is then closed for a few minutes, when the curtain comes out perfect.

This machine is manufactured by the Bay State Laundry Machine Co., Cambridgeport, Mass.

The Cleveland (O.) Crucible Steel Company has completed its organization by electing J. H. Clark President, and E M. Grant Secretary and Treasurer. A new building has been erected in which to manufacture the fine grades of tool and machinery steel.

Pittsburgh capitalists talk of starting a brass foundry in Youngstown, O.

The stationary engineers of Pittsburgh, Pa., have formed an association to hold weekly meetings and discuss questions regarding the management of engines and boilers. The Society is started upon about the same plan as those of New York City and Brooklyn, which were reviewed in our issue of June 28, 1879. They intend to agitate the question of passing State and city laws requiring the licensing of engineers.

Narrow Gauge Railroads.

It seems that the prediction made not many months ago for the narrow gauge railroad, that it had a bright future before it, is being fulfilled in a measure by the adoption of the two foot gauge in several localities lately reported.

One is the proposed route from Portland to Bridgeton, Me., which, it is thought, will be built the coming season; another from Skowhegan to Athens, or some point back in Somerset county; and another from Belfast through Searsport to Bucksport or some point near there; all of the above proposed routes in Maine. The road in Florida to run from St. Augustine through Jacksonville to Indian river is to be built by a company recently formed and composed largely of Boston men, one of whom is its president.

We learn that many inquiries from parties in other states have been received as from New York, Pennsylvania and Texas, all desiring to know something about the cost of building and operating such a road as the Sandy River of Maine, the continued success of which, even beyond the most sanguine expectations of its projectors, has caused people to investigate, consider and adopt this system where a cheaply constructed road is wanted for a small business.

One of the favorable signs of industrial improvement throughout the country is shown in the increasing disposition of foreign capitalists to invest money in American productive enterprises. Some extensive beet sugar and glucose factories are about to be established by foreign capitalists, because they see that these investments are likely to pay them handsomely.

An epitaph in a Vincennes, Ind., cemetery, tells the sad ending in a nutshell: "His neighbor played the cornet."

Under the head of Machinery Exports on page 8 of the present issue only a part of the exports from Great Britain and a part of the ports of destination are given. In going to press with the form containing that page some of export list was accidentally omitted.

Manufacturing Notes.

A hosiery mill will be started by Eastern men on York avenue, Philadelphia, above Rising Sun lane, this spring, provided satisfactory arrangements can be made for the ground.

A large silk mill will soon be added to those already established in Paterson, N.J.

McKee, Fuller & Co., of Fullerton, near Catasauqua, Pa., are building a hundred-feet extension to their car works, and intend employing an additional force of men. When the extension is completed the company will put up two large steam hammers.

There is talk of establishing cutlery works at Easthampton, Mass.

Sawtelle & Judd, Hartford, Conn,, have recently introduced a pulley lathe to swing wheels 8 feet in diameter.

A new silk mill is to be started at Hillsboro', N. H., as soon as the machinery can be made.

The new silk factory at East Hampton, Conn., is about to begin work with a capital stock of $50,000. A building not yet completed, 40×100 feet, and two stories high, will be used for making cotton thread.

E. A. Robinson, jewelry manufacturer of Attleborough, Mass., has made preparations to erect a new brick factory, 99 feet by 80, and four stories high.

An addition of 65×75 feet is being made to the buildings of the New Haven Wire Co., in East Haven, Conn.

Foster Bros., Danbury, Conn., are soon to erect a hat factory, of which the main building is to be 130x26 feet, three stories high.

The Danielsonville Cotton Company, Danielsonville, (Conn.), again increased the wages of their operatives on March 29. This is the second advance made to their operatives since January 1.

S. A. Morris and Albert Curtis, of West Brattleboro. Vt., propose to begin the manufacture of the Curtis machine screws at Brattleboro.

An addition, 60x40 feet, is building to the Parker Spoon Works at East Meriden, Conn.

Mr. John L. Gill, Jr., of the Pittsburg Car Wheel Works, is preparing an apparatus for testing the strength of different screw-threads now in use. The tests will have the special object of determining the relative strength of the V thread with sharp edge, the United States Standard thread, and the V thread, one-fourth off, respectively The testing machine is of the ordinary kind, and is provided with a micrometer and electrical attachments so as to insure accuracy.

A new smelter is being built in the Park Mining District, Utah. It will have three stacks, and the works will cost $60,000.

A syndicate has been formed, composed of the following gentlemen, who have organized the Metropolitan Fuel-Gas Company: Philip Kissam, representing William Astor; Edwin D. Morgan, William Walter Pheips, Abram S. Hewitt, James S. Pinchot, A. S. Barnes, H. B. Hyde, Henry Day, Walter E. Lawton, Sidney A. Stevens, and several other capitalists. This company has secured the exclusive right to the Strong process for the city of New York, deriving their right from the American Gas-Fuel and Light Company, of which latter Company Mr. M. H. Strong, the inventor, is president, and Mr. William B, Buck, secretary.

A company in St. Louis is about to begin the manufacture of a patent self-regulating wind engine.

The Central Vermont shops, at St. Albans Vt., are building ten observation cars for the accommodation of excursion parties. Each car is 33 feet long, and is fitted with twelve double seats, thus accommodating 48 persons. The side windows are without sash or glass, but have patent shade-roller curtains instead. The doors are on the side, and move on a sliding scale.

The Billmeyer & Smalls Company, of York, Pa., has secured a contract to furnish a Japanese railroad with cars, and it will be the first railroad in Japan equipped with American rolling stock.

Warner & Swasey are to begin the manufacture of machinists' tools at Chicago. They will make a specialty of cutters, for gear wheels, gear cutting, and will also manufacture astronomical instruments and machinery.

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☞ *Every correspondent, in order to insure attention, should give his full name and address, not for publication, but as a guarantee of good faith.*

☞ *We are not engaged in procuring patent rights, or in selling machinery; nor have we any pet scheme to advance, or hobby to ride.*

☞ *We invite correspondence from practical machinists, engineers, inventors, draughtsmen, and all those specially interested in the occupations we represent, on subjects pertaining to machinery.*

☞ *Subscribers who fail to receive their paper promptly will please notify us at once.*

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NEW YORK, APRIL 17, 1880.

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Spring Openings.

At this season of the year, when "Spring Openings" of dry goods, furniture and other kinds of merchandise are given much prominence, it is well to take a glance at the machinery openings.

Our columns, from week to week, have borne evidence of extraordinary activity in the machinery industries. New shops and enlargements of old shops form the subject of numerous items, while extensive preparations to manufacture new tools and machines are frequently being made.

Novelties, however, are now carefully tried before risking much in their production. The character of the machinery now being originally introduced is much better than that received with favor three or four years ago. Cheap and poorly made machines are becoming difficult to sell, the demand being for a higher quality than for some years past.

The condition of the machinery business is very clearly seen by any one wishing to get any special article built on contract. It requires considerable diligent inquiry to find a well-prepared shop so little pressed with work as to be able to undertake a special contract upon short notice. Every indication is favorable to a successful spring opening of the machinery industries.

This issue of the AMERICAN MACHINIST will be in the hands of a large portion of its readers on Wednesday, April 7, the day of the meeting for organizing the American Society of Mechanical Engineers. A large and interesting meeting is already assured. Our issue next week will contain a complete publication of the rules adopted by the Society; names of the officers elected and a correct account of the proceedings, as well as the names of those present.

American and English Workmen.

The impressions of English manufacturers who have spent a few weeks in inspecting the workshops of our country are sometimes very interesting when publicly related. In the course of a lecture in Sheffield by W. R. Marples of that city, who had recently paid a visit to America, he made the following remarks:

"Some time was spent in visiting various factories, and I found, as I had anticipated, machinery much more generally used than it is with us—in fact, I sometimes saw machinery employed for a process which might have been done more cheaply by hand labor; but we must remember that until recently skilled workmen were not numerous in the States, and so manufacturers were driven to the use of machinery. When I was there trade was so depressed that there were many men out of employment, and taking into account the extra cost of everything except food, wages were not so good as here. One thing struck me very forcibly, and I would call the attention of working men to the fact: I went over three factories between 7 and 11 on a Monday morning, and there was hardly a workman absent from his post; the masters would hardly believe me when I told them that *in a Sheffield factory very few men work on Monday*, and that many do not go fairly to work until Wednesday or Thursday. *The workmen are intelligent, clean, and well dressed*, and the utmost goodwill appears to exist between masters and men. The Americans are much more advanced in manufactures of all kinds than many of us are aware. Cabinet furniture, glass and china, cutlery, tools, guns and pistols, agricultural implements, carpets, linen, in fact, soft and hard goods of every description are made, and in most instances made well, in the United States. Their resources are wonderful; nature has given them coal, iron, waterpower, &c., with the finest navigable rivers in the world; and then their chiefly English origin has given them pluck, endurance, and perseverance under difficulties, and these qualities, coupled with the immigration of many of our best artisans, have in the comparatively short space of 100 years worked marvels for them. No wonder, then, that Jonathan is more than rather conceited, and guesses that poor old John Bull is nearly played out and 'bust up'; but, as I told them, 'there's life in the old dog yet.' The New England States are one vast hive of manufacturing industry, and it is here that the brains of inventors are stimulated to their utmost powers in developing labor-saving articles, and the machinery to make them. I think the introduction of the many American ideas and inventions into England that has been attempted during the past few years will tend to develop new ideas amongst our work-people, and assist us in holding our position as the great manufacturing nation of the world."

These must have been rare cases discovered by Mr. Marples where using machinery was more expensive than doing the work by hand. But he, perhaps, lacked complete data for comparing the cost of two processes, and reached a conclusion by mere guess work. It will no doubt be highly amusing to most of our readers to hear an English opinion publicly expressed that American manufacturers have been "driven to the use of machinery" by reason of the scarcity of skilled workmen. It must have seemed paradoxical to the Sheffield audience to be directly afterwards instructed that the nation "until recently" so deficient in skilled workmen had introduced ideas and inventions into England that were likely to result in spurring their own workmen into emulation.

Mr. M. seems to be greatly surprised that American workmen do not, as a rule, go upon a debauch as soon as they are paid every Saturday night, and continue it two, three or four days. He is particular in dwelling upon the fact (as though it were a matter of wonder) that the workmen he saw on his visit here gave evidence of being gentlemen, "intelligent, clean and well dressed," and that there was no social barrier of separation "between masters [employers] and men." He might have discovered the reason, had he studied deep enough into the political and social systems of the two countries and the contrast therein presented. The institutions upheld in England—virtually as strongly as if maintained by law—do not permit the worker for wages to stand upon the same social plane as his so-called master, be he ever so industrious and gentlemanly in deportment. Consequently, it is extremely difficult for the British workman to rise to the position of a proprietor and employer. The workman, therefore, associates almost entirely with his fellow-workmen. As he is kept at a social distance from his employers he naturally comes to believe that the latter regard him as little better than an automatic machine, becomes obstreperous and is almost always ready to go on a strike upon the slightest provocation. Having small hopes of any high advancement he tries to enjoy himself by drinking and roystering as he obtains the means for such debauchery.

The American workman, as tersely set forth in Chordal's Letters two weeks ago, "may choose whether he will frequent the finest homes in the land, or the lowest pot houses. There is no social bar whatever to his political distinction. Every prospect for the future which this world holds out for its choicest people, this land holds out for the smart mechanic." In England it is very different. But the difference is not caused by lack of natural resources—coal, iron, water power, or navigable rivers—nor by climatic influences, but by artificial social systems, which are everwhere directed against the men who evolve useful forms from inanimate matter. If American ideas could be introduced into England, to the extent of revolutionizing those systems, there would be no fear of losing her position as the great manufacturing nation of the world, but there is no probability that such a reformation will be made.

Local Engineers Societies.

The civil engineers of Cleveland, O., have lately met and organized a society to hold regular meetings for the reading and discussion of papers, and general improvement. Local engineering societies now exist in Boston, Philadelphia, Chicago, St. Louis, Syracuse, Pittsburgh and Cleveland. Most of them hold monthly meetings. Some of these societies have provided for the printing of their papers in pamphlet form for circulation among members. The formation and practical success of these local societies is a gratifying indication of the elevation and advancement of the mechanic arts in our country. Engineers' societies are numerous in England, and to their active operations may be attributed, in no insignificant degree, the position she occupies as the greatest manufacturing country on the globe. With an efficient national organization of mechanical engineers and a local organization (whether civil or mechanical) in each prominent manufacturing center, we can rest assured of satisfactory national progress in all the constructive arts.

The Melbourne Exhibition.

A creditable display of American productions at the Melbourne International exhibition now seems assured. Applications for space have been received from eighteen different States, and the prospects are that with the transfers from the Sydney Exhibition there will be from 300 to 350 exhibitors from this country. Mr. T. R. Pickering, United States Government agent, has decided to extend the time for receiving applications for space until May 1. His office is in Room 102, Post Office Building, New York City. The largest number of applications thus far have been received from Massachusetts, which heads the list with 33 exhibitors. New York comes next with 23, and Pennsylvania and Connecticut follow each with 12 assignments of space. It is worthy of note that the State of Connecticut has appropriated the sum of $2,000 to assist in defraying the expenses of a proper representation by her manufacturers.

In order to make the most creditable display in machinery Mr. Pickering still desires a few more exhibits of wood working machinery, machine tools and steam engines.

Exports of Machinery.

We have taken some pains to collect the summary of machinery exports for a single week from Great Britain, and from the port of New York for a corresponding period. In the following table the first column exhibits the value of machinery exports from the United Kingdom for the week ending March 6, 1880, and the second column the value of the machinery exports from the port of New York, for the week ending March 9th:

Hong Kong	£ 27	
Calcutta	3,304	
Hamburg	563	$8,104
Danzig	.....	2,000
Bremen	7	1,179
Rotterdam	506	2,057
Antwerp	810	8,280
Hull	.....	3,580
London	.....	15,289
Liverpool	.....	4,090
Bristol	.....	2,200
Cuba	.....	5,024
Luarca	.....	403
French West Indies	.....	224
United States of Columbia	.....	10,031
Brazil	.....	9,113
Venezuela	.....	118
Mexico	.....	23,444
Marseilles	53	6,350
Bordeaux	12	14,050
British West Indies	.....	204
British Australia	.....	6,003
Havre	.....	103,943
Rangoon	30	
Central America	.....	11,343
Porto Rico	.....	473
Hayti	.....	8,180
China	.....	400
Boulogne	796	
Bilboa	74	
Santander	172	
Seville	151	
Amsterdam	46	
Alderney	2,400	
Barcelona	27	
Odessa	50	
Brussels	174	
Cadiz	515	
Lisbon	810	
Copenhagen	1,250	
Natal	2,014	
Cape Town	408	
East London	7,390	
Algoa Bay	70	
Ceylon	5	
Java	77	
Shanghai	538	
Singapore	91	

Included in the British exports of machinery, above mentioned, are steam engines of values as follows: Hamburg £430, Alderney £2400, Cadiz £515, Copenhagen £1250, Natal £485, East London £7208, Shanghai £425 and Calcutta £1860. The largest British

export of agricultural machinery in the list is to Natal, amounting to £1265. A considerable portion of the above exports from the United States are agricultural implements and machines. In this list are included one locomotive and two fire engines.

Qualifications for Membership of the Mechanical Engineers' Society.

Just before going to press we are in receipt of the following communication:

Editor American Machinist:

Your leader of the 3d criticises a recommendation to (not by) the Committee on organization, concerning qualifications for membership, and expresses the belief that the measure will be rejected by the meeting of April 7th.

Would it not be as well to call attention to the possible errors of the Committee, after it has placed before the meeting of April 7th something to reject or to accept? The Committee postponed a vote on qualifications for membership, in order to act at its final meeting, after more mature deliberation.

A. L. HOLLEY.

In explanation of the course we have taken, we must say that under ordinary circumstances we would not presume to call attention editorially or otherwise to the "possible errors of the committee." In the *Railroad Gazette* of March 12 the editor, Mr. Forney, published a long leader (nearly a page) calling attention to possible errors of the Committee on Organization, of which he was afterwards appointed a member. Immediately upon becoming a member of this committee, Mr. Forney urged the adoption of those changes in the rules previously advocated in his editorial. With this we find no fault. But when he further recommended such a radical change in the qualifications for membership as in our opinion would exclude some of the participants in the preliminary meeting, and action was deferred until two days before the organizing meeting of April 7, for "more mature deliberation," we deemed it proper to make these proposed radical changes known to our readers. Otherwise a great number of the men invited to attend the organizing meeting (many of them coming from a distance) might be liable to find requirements demanded of them, *wholly different* from those named in their invitation, as being recommended by the preliminary meeting to the Committee on Organization. In a short session the organizing meeting would not have sufficient time to properly consider these important changes without some previous knowledge of what was suggested. The original requirements for membership were extensively published in the daily, weekly and technical papers after the meeting. As conductors of a mechanical journal we claim the right to serve the interests of our constituents as well as the participants in the February 16 and April 7th meetings, without implying want of confidence in or discourtesy towards the organizing Committee.

LITERARY NOTES.

THE MECHANICIAN, A treatise on the construction and manipulation of tools, for the use and instruction of young engineers and scientific amateurs. Comprising forging, planing, lining, slotting, shaping, turning, screw-cutting, etc. By Cameron Knight. Illustrated by 96 4to plates, containing 1147 illustrations, and 397 pages. Second edition, 4to cloth, price, $7.25. E. & F. N. Spon, 446 Broome Street, N. Y.

The second edition of the Mechanician is a book which is reprinted from the first, and while it retains the same size, and contains the same amount of matter, it is furnished at less than half the price of the first edition. The Mechanician is, in reality, a practical book of processes, commencing with blacksmithing, describing the manner in which the different parts of engines are forged, planed, lined, turned, and otherwise treated, until they are ready to put together. The two principal objects aimed at by the author are: To explain to apprentices and students the general principles involved in building engines, and how to do the work, also to furnish a handy book of reference to refresh the memory of the advanced engineer and mechanic in the more difficult departments of their pursuits.

The first chapter is devoted to instructions in forging, giving explicit instructions in the selection and working of material. The second and third chapters are devoted to descriptions of the tools required in the different branches, also how to make them. As no work can be done without tools and implements, they are described at this stage in the work, as they are to be used in all subsequent operations. Chapter four describes the processes of taking the rough forging and laying out the work, after which the lining and planing processes are fully explained. All subsequent operations depend upon the accuracy of the foregoing. The fifth chapter considers the details of shaping and slotting, both by hand and by machinery. Turning and screw-cutting occupy the sixth chapter, in which all the details are given. This book is the result of the experience of the author who is a practical engineer, and has been engaged for over twenty years in building engines, and has found that however retentive the memory of a machinist is, as he advances from one process to another, he is liable to forget some of the useful details connected with the former processes.

Business Specials.

40 cts. a line for each insertion under this head.

H. R. Worthington, 239 Broadway, N. Y., has lately issued an enlarged circular of Worthington Steam Pumps. It will be noticed that the prices are the same as in the last list, being lower than those of any other steam pump in the market.

MacKenzie Patent Cupola and Blower. The best apparatus for melting iron, and with water bosh for smelting lead and silver and copper ores. Send for pamphlet. Smith & Sayre Mf'g Co., 21 Courtlandt Street, New York.

For Schaffer & Budenberg's celebrated Steam, Pressure, Hydraulic and Vacuum Gauges, Engine Counters, Pyrometers, Thermometers, Reducing Valves, Superior Crystal Gauge Glasses, etc., address W. Heuermann, 40 John Street, New York.

American Watch Tool Co., Waltham, Mass., Whitcomb Watch Makers' Lathes, and Watch, Watch Case, and Clock making Machinery.

For bottom prices on Brass Castings, and Catalogue, address H. B. Morris, Ithaca, N. Y. Models and machinery to order.

See Standard Turbine advertisement in late number.

Wilkinson & Crowell, 1291 Beach St., Philadelphia, make an Improved Metallic Piston Rod Packing, which is entirely automatic and of great durability. Works well at high or low pressure, and can be used in common stuffing box, or without any stuffing box at all.

Norris & Rutter, Mechanical Draughtsmen and Patent Solicitors, 424 Walnut Street, Philadelphia.

A new automatic valve gear for steam engines complete. Address, Ed. F. Williams, P. O. Box 148, Leadville, Colorado.

Lathe Attachments for Milling Plane and Irregular Forms; Taps and Reamers fluted and Gears cut without removing from the lathe centers. For extended description, see AMERICAN MACHINIST, Sept. 13 and 20 issues. Send for circular to Wm. Main, 65 Henry Street, Brooklyn, N. Y.

James W. See, Consulting Engineer, Hamilton, Ohio.

Car Builders' Dictionary. Now ready. Assigns names to kinds and parts of railroad cars, identifying each. 800 engravings, and 490 pages. Price, postage prepaid, $2. Ten copies to one address, $17.50. Published by the *Railroad Gazette*, 73 Broadway, New York.

Engines Indicated—Power Measured. W. H. Odell, Box 274, Yonkers, N. Y.

Manual of Power for Machines, Shafts, and Belts, with the History of Cotton Manufacture in the United States, by Samuel Webber, C. E., copyrighted 1879. Only work of the kind extant; 240 pages. Price $3. Address, D. Appleton & Co., New York, or the author, Manchester, N. H.

Sheet Metal Presses. Ferracute Co., Bridgeton, N.J.

A saving of over 100 per cent. in fuel.—The new Pulsometer Steam Pump; Satisfaction guaranteed; send for descriptive pamphlet and prices. Pulsometer Steam Pump Company, sole manufacturers, 40 John st., N.Y.

To Manufacturers and others: We are prepared to build all kinds of machinery. Patent Articles a Specialty. Correspondence Invited. Mather & Newitt, Practical Machinists, Leominster, Mass.

J. F. Tallant, Engineer, Burlington, Iowa, makes a specialty of saving fuel and increasing power of defective boilers and engines.

Recipes and Information to Manufacturers on all Industrial Processes. Address Park Benjamin's Scientific Expert Office, 37 Park Row, New York.

John Fish, M. E. Air Compressors and Working Drawings a specialty. Room 23, 10 Pine St., New York.

Sheet Metal Drop Presses. Stiles & Parker Press Co., Middletown, Conn.

W. Barnet Le Van, Mechanical and Consulting Engineer, 3607 Baring Street, Philadelphia, Pa.

Questions and Answers.

Under this head we propose to answer questions sent us, pertaining to our specialty, correctly and according to common sense methods.

(1) S. A. R., Helena, Ark., asks: Will you tell me what the process is of making crucible castings of iron or steel? (I mean the melting process). Do they use an air furnace, as for brass, or do they use blast? *A.*—The furnace used for melting steel is generally made by first constructing an iron box about 36″ square and 72″ deep. One of the sides of this box is about 42″ in length from the top, which leaves 30″ for the ash pit. The inside of the box is lined with fire brick, the size of which is 2½″ × 5½″ × 10″, which leaves the size of the furnace 26″ square when finished. A blast is used which is introduced into the ash pit. After the fire has been started, the ash pit is closed by means of a heavy plate of iron, and sealed. The crucible is sometimes placed upon a pedestal formed by placing a worn-out crucible upon the grate, bottom up. This is necessary with a coke fire, to prevent the crucible from settling down upon the grate. The crucible used is made of a special material for melting steel. The pot must be covered while melting, to prevent a waste of carbon. The time taken for a heat is from 4 hours to 4½ hours. In order to be successful in making steel castings a man must understand the character of metals to make the proper mixtures. If you have much work of this kind to do we would advise you to hire a man who understands the business, as you can by bad management waste a fortune in a very short time. Use hard coal, as coke is not the most economical fuel for melting steel.

(2) J. J. L., Rochester, N. Y., asks: Will you please inform me through the columns of your valuable paper, what is the best substance to use on the smooth surface of an iron pattern before sending it to the foundry? and oblige. *A.*—Clean and smooth your iron patterns thoroughly, then give them a coat of shellac occasionally, to prevent them from rusting. Before using in the foundry they should be well rubbed with graphite, or black lead, to prevent the sand from sticking to the surface.

(3) J. R. F., New York, says: Will you be so kind as to answer in the columns of your paper: What is the best kind of a valve to use in the steam-chest of a pump, where motion is communicated to the valve by an arm from the piston striking the valve-rod at each end of the stroke? And is there a patent covering it? and oblige. *A.*—It will be necessary for you to give us a sketch of the arrangement of your pump, also dimensions of steam and exhaust ports. The principle involved in your question is still a matter of discussion among persons who build and use pumps, and a difficult one to decide.

(4) C. R. H., Winona, Minn., asks: What preparation can I use upon the face of a watch to give it a *luminous* appearance in the night sufficient to note the time. I have seen watches of this kind, and would like to know if an ordinary watch can be made so? *A.*—Prosphorescent light is of French origin and has been known since the middle of the seventeenth century. The subject is still a matter of experiment, and cannot yet be regarded as an entire success. Probably the most successful compound is used upon the faces of the illuminated clocks made by the Ansonia Clock Co., of Ansonia, Conn., which is composed principally of the Sulphide of Calcium. Other luminous compounds can be made from phosphorus and strontium. It is necessary that these compounds be exposed to the light during the day, as their peculiar property is to absorb light during the day, and give it out at night. For this reason we would not depend upon it as a success upon a watch face, as this is always excluded from the light.

MANUFACTURES.

Sawtelle & Judd, Hartford, are to build a large size of their Hamilton Condenser to be applied to a new 450 horse power engine to be built by Corliss for Plume & Atwood. Waterbury, Conn. It is estimated that the condenser will increase the capacity of the engine to 600 horse power.

J. Estey & Co., organ manufacturers, Brattleboro, Vt., talk of establishing a branch factory at Sherbrooke, P. Q.

H. H. Abel is building a large machine shop at Laconia, N. H.

Dallas, Texas, expects soon to have a large car factory, employing 600 men.

All the locomotive shops at Paterson, N. J., are running on full time, and they have not been so busy before for over five years.

A silk spinning mill and a condensed milk manufactory will soon be started at Fort Plain, N. Y.

The Jessup & Moore Company will spend almost three quarters of a million upon their new paper mill at Wilmington, Del. The foundation is to be built upon stone laid upon piles, so as to secure a good wharfage.

Among manufacturing establishments which have recently introduced the Electric light, is that of the Fitchburg Steam Engine Company of Fitchburg. The improvement is not an experiment with them as they have furnished the apparatus for lighting the tents for three circus companies and fifteen manufacturing establishments. The machine for lighting the shop is a four light machine, each light being equal to 3,000 candles. The whole lighting power is equal to 700 gas jets. The amount of power required to run the machine is about three-fourths of one-horse power for each light, or three-horse power for the four lights required to light the shop. The company are running their works day and night and are in need of more good machinists, as they have twenty-seven unfilled orders for engines from 200 horse-power down, still unfilled.

The firm of Kistner & Sciple, engine builders, Bordentown, N. J., have dissolved partnership by mutual consent. The establishment is now known as the Bordentown Foundry and Machine Works, employing 30 hands and running 15 hours per day. Their work is principally on the Sciple engine, on which they are two months behind their orders. They have just put in a new lathe of 37″ swing weighing five and one half tons. Also one 16″ swing, and expect a 20″ swing in a few days; also one very large and one small drill press. Their next door neighbors, the Union Steam Forge Company, are running day and night.

The extensive wall paper manufactory of Howell Bros., Camden, N. J., will be reopened, and operations actively resumed at an early day. It has been closed some time on account of the lack of orders.

The Camden and Atlantic Railroad has altered one of its old engines, called the "Sea Gull," into a "dirt burner," putting in a new boiler and making other needed repairs. It is now being run on the freight train to get it in good running order to take the heavy excursion trains during the coming summer.

Castle & Hitchcock, Indianapolis, Ind., builders of experimental, special, and fine machinery, have put in a new Pratt & Whitney 12-foot planer, and other new machinery to keep up with the demands of their business. They have just completed an improved Force Pump of new design, for pumping ammonia in large pork-packing houses, and expect to build a number of them. They will also build an addition to their shop this season.

The drum factory of Noble & Cooley, at Granville, Mass., is about two months behind orders. This is a remarkable statement, in view of the fact that the increased volume of business during the past few months has compelled many mercantile houses to withdraw their drummers from the road.

The new firm of McMurray, Church & Co., composed of gentlemen connected with the Buckeye Engine Co., Salem, Ohio, have leased the entire property known as the Kensington Iron Works in Philadelphia, and will run it to its fullest capacity as an "Annex" to the Buckeye Engine Co. The two organizations, though financially independent of each other, work together otherwise, building the Buckeye Engine exclusively from the standard patterns, and making all contracts through the Company and its regular agents.

The Buckeye Engine Co. have found their extensive enlargements inadequate to meet the demand, and not content with "swarming" to Philadelphia are about arranging for still a third shop in New England.

Among the larger contracts now in execution are: the Brooklyn Grain Elevator, 1,500 H.P; Pacific Mills, Lawrence, 1,000 H P.; Merrimac Mfg. Co., Lowell (4th order), 1,000 H P.; York Mills, Saco, 700 H.P.; Ocean Mills, Newburyport, 750 H.P.; Ponemah Mills, Norwich, 400 H.P.; S. D. Warren & Co., Pepperell, 400 H.P.; Philadelphia Grain Elevator Co., 400 H.P.; Jessup & Moore Mfg. Co., Philadelphia, 300 H.P. They are also building several engines of from 200 to 400 H.P. for the Silver Cliff, Platte Verde, Empire, Walker, and other mines of Colorado and Utah.

Merchant & Co., 525 Arch, and 520 Cherry Sts., Philadelphia, write us: Owing to a rapidly increasing demand for tin plates, metals, seamless tubing, sheet copper, etc., during the past two or three years, we find our present store insufficient for our requirements, although it reaches from Arch to Cherry street, a distance of 300 feet, and in order to meet this demand for space, we are now erecting a four-story iron-front building on Arch St., 25×85, which will give us additional office room. Should business continue to increase for the next year as it has during the past, this additional room will not more than meet our requirements.

Whitehead & Atherton, Lowell, Mass., are completing their new factory. The machine shop is to be of brick, 200 by 50 feet, increasing their capacity 200 per cent. A blacksmith's shop, engine and boiler house and store room will be added to their new foundry. 300 hands will be employed.

The Cleveland (O.) Oil Cup Company, has just been incorporated, capital $20,000; incorporators Mr. John Smith and others.

A glucose factory with a capital of $150,000 is about to be established in Cleveland, O. The principal gentlemen interested are Sprankle, Morse & Co., and E. Grasselli, the chemist.

Machinists' and Engineers' Supplies.

New York, April 1, 1880.

Business good, and not much change in prices.

Five leading makers, including the Pratt & Whitney Co., J. M. Carpenter, and the Morse Twist Drill and Machine Co., have advanced the prices of Taps and Dies about 10%, to take effect to-day, by reducing the discount, leaving list unchanged.

The American Screw Co. reduced the prices of wood screws 5% on March 30th.

Machine Screws remain unchanged, and some dealers think there will be no advance.

C. H. Delamater & Co., New York, have issued a pamphlet catalogue, describing a new line of Steam Pumps for all purposes, including Water Works Pumping Engines.

Wm. L. Sweetland, formerly Superintendent and manager of the E. Horton & Son Co., Windsor Locks, Conn., has formed a co-partnership under style of Sweetland & Company, for the sole manufacture of "the Sweetland Chuck." The new firm have located at 126 Union Street, New Haven, Conn., where, with the latest improved machinery and complete facilities, combined with Mr. Sweetland's sixteen years experience, in this particular business, they will soon be ready to fill orders. Prices will be furnished by them on application.

Henry R. Worthington, 239 Broadway, New York, under date of March 1st, 1880, has issued a new price list of steam pumps, making a considerable reduction.

Metal Review.

LUCIUS HART & CO., 8 & 10 Burling slip, New York, furnish us the following, under date of April 1, 1880:

The Metal Market though still dull, is fairly steady with a better feeling throughout. Pig Tin dropped in London to £84, reacted to £88, and at present writing is £86.10/; Singapore, $29½. We quote Spot Market nominally; Banca Tin, 24 c.; Malacca & Straits, 21½c.; Billiton, Australian and English Refined, 21c. to 21¾c.; "Lamb & Flag," 20½c. to 21c. Pig Lead, steady at 5¾c. and up. Antimony, scarce; Cookson, 24c.; Hallett & Johnson, 19½ to 20c. Spelter, 6¾c. for American; Silesian, 6¾c.; Ingot Copper, 22¾c.; Nickel, $1.25.; No. 1 Solder, 12c.; "Half-and-half," 14c.

Iron Review.

New York, April 1, 1880.

Pig iron is dull, unusually so for the season. Prices have declined about $5 a ton from their highest point, and the tendency is to still lower figures. Very few large consumers have paid the highest prices for pig iron, having made contracts ahead at the lower rates. We quote nominally No. 1, $37 to $38, No. 2, $36 to $37, grey forge, $35 to $36. These prices could be shaded for large lots. Scotch pig sells in small lots at the following prices: Eglinton $28, Glengarnock $28.50 to $29 and Coltness $31.50. There is a good demand for old rails at $38 to $38.50 a ton.

The general iron market continues in favor of buyers, and the following quotations are nominal, as quantities can be bought for less.

Pierson & Co., 24 Broadway, N. Y., under date of April 1st, 1880, quote prices out of store as follows:

Iron Rails, $68 to $70, according to weight; Fish Plates, 3¼c. per lb.; Railway Spikes, 4¼c.; Bolts and Nuts, 5c.; Common Bar Iron nominal, 3 7-10c., basis from store; Refined do., 4c., basis; Ulster, 5c., basis; Machinery Steel, 7c.; Best Tool Steel, 13½c.; Norway Bar Iron, 6¾c.; Norway Shapes, 6¾c.; Nail Rods, 7c.; Sheet Iron, 4¼c., basis; Angle Iron, 4 3-10c.; Tee Iron, 4 8-10c; Band Iron, 4 7-10c.; Hoop Iron, 4 8-10c., and up according to size; Horse Shoe Iron, 4¼c.; Hot Polished Shafting in lengths, 2 ft. and longer, 9 to 10½c., according to size; Small Black Rivets, 30% off in papers, 10% off in bulk.

Carmichael & Emmens, 130 Cedar Street, New York, under date of April 1st, report Boiler-makers supplies: Flange, 6c.; C. H. No. 1 Shell, 5c., C. No. 1, 4¾c.; Sheets, 4½c. basis; Boiler Tubes, 10 to 20% discount.

WANTED.

Two brothers, first-class general machinists and tool makers, want a job. West preferred. Address, stating work and wages, A. Ladd, 11 West Adam street, Syracuse, N. Y.

Wanted Foreman of a Machine Shop one accustomed to fitting hardware or light work, also Metal Pattern Maker familiar with the gating of small patterns. Apply to St. Louis Malleable Iron Co., St. Louis.

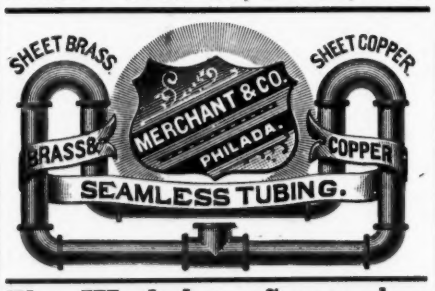
Wanted to correspond with parties in need of a first class mechanic and draughtsman, who can design and construct modern steam power, mill work and special tools. Could act as foreman in machine shop and set up work in case of emergency. Address J. S., care American Machinist, 96 Fulton St., New York.

Wanted 20 good Machinists and 10 good Moulders. H. B. Smith Machine Co., Smithville, Burlington Co., N. J.

MACHINE
DRAWING COPIES
TEN CENTS EACH.
Send for List of Plates, now ready, and Catalogue of Books for Practical Engineers.
E. & F. N. Spon, 446 Broome St., N. Y.

CLARK'S FUEL:
Its Combustion and Economy.
Recent practice in the Combustion and Economy of Fuel: Coal, Coke, Wood, Peat, Petroleum, etc.
12mo. Cloth. 1879. Price, $1.50.
Copies sent by mail, post-paid, on receipt of price.
D. VAN NOSTRAND,
23 Murray and 27 Warren Sts., New York.

Engine Lathes and Planers.
Ready for delivery in from 4 to 8 weeks. Sixty lathes from 13 to 20 in. swing. Five Iron Planers, 24 in. x 6 ft. These are all NEW TOOLS with LATEST IMPROVEMENTS built to our order at the very best New England shops. Send for prices, &c., to
HILL, CLARKE & CO.
36 & 38 Oliver St., Boston, Mass.



The Workshop Companion.
A handy and useful dictionary of practical information for **Engineers, Machinists, Draughtsmen and Mechanics**, containing useful and reliable recipes, rules, processes, methods, practical hints, &c. **NO** medical or cookery recipes. 164 pages. This book will be sent, post-paid, on receipt of Twelve 3-cent postage stamps.
T. P. PEMBERTON,
249 Duffield St., Brooklyn, N. Y.

1880 EIGHTH *1880*
Cincinnati Industrial Exposition
THE EIGHTH EXHIBITION OF
ART AND INDUSTRY
Will open September 8,
and close October 9, 1880.
IN THE
GRAND PERMANENT BUILDINGS.
ITS REPUTATION IS NATIONAL.
Exhibitors from 24 States last year.
Its honorable record is world-wide, and its management is guaranteed by a popular public subscription, and is held under the joint auspices of the **Chamber of Commerce, Board of Trade, and Ohio Mechanics' Institute**, who have so satisfactorily conducted these Expositions since 1870.
No Stockholders! No Dividends!
No Private Interests to Subserve!
No Charge for Space or Steam Power!
Full Premium Lists will be ready May 1.
HUGH McCOLLUM, Secretary.

Brainard Milling Machine Co.
Universal Milling Machines a specialty.

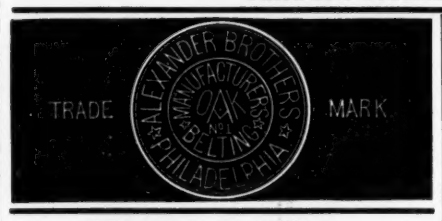
SIX SIZES.
Weight 600 to 4000 Lbs.
GOLD MEDAL awarded at last Mechanical Exhibition in Boston for greatly "advanced improvements" and "perfect workmanship."
See new illustrated Catalogue.
WORKS AT HYDE PARK, MASS., U. S. A.
Office, 36 OLIVER ST., Cor. Franklin,
BOSTON.

FOR SALE.
Three Boilers 24 ft. long, 6 ft. diameter, return drop flue, 80 horse-power, A1 make and condition. $1,500 each. Address, E 14 White St, New York.

FRASSE & COMPANY,
62 Chatham Street, New York.

Fine Tools, Files, Steel Wire,
AND
SUPPLIES FOR MACHINISTS A SPECIALTY.

SWEETLAND & COMPANY,
No. 126 UNION ST., NEW HAVEN, CONN.
Sole Manufacturers of
THE SWEETLAND CHUCK,
Independent, Universal and Eccentric Combination.
PRICE LIST FURNISHED ON APPLICATION.



FOR SALE.
A Works completely equipped for the manufacturing of carriage axles; is well located in relation to Coal and Iron, also very accessible to market. Address
E. P. BULLARD,
14 Dey Street, New York.

S. & C. WARDLOW,
SHEFFIELD, ENGLAND,
SOLE MAKERS OF THE SPECIAL BRAND
TOUGH
CAST STEEL,
For Turning and other Tools,
ALSO DIES, ETC.
Branch Office & Stores: 95 John St., New York.
WILLIAM BROWN, Sole Agent.

CHAS. G. LUNDELL,
No. 7 Exchange Place,
BOSTON,
MASS.
REPRESENTING
SWEDISH IRON
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GOTHENBURG,
SWEDEN.

JAMES D. FOOT
No. 40 Broadway, New York.
Machinists' Surface Gauge.

Height, 8 inches. Arm will scratch 8 inches and 13 inches high. Nickel Plated and a first-class tool.
Price, $2.00.
Description of Machinists' Marking Gauge and Scratch Awl, combined—The Arm is made hollow, holding the Awl which screws in at the end. The Awl is made of Stubs' Steel.
Price, 75 Cents.
Description of Machinists' Scratch Awl.—Length, 6½ inches. Made from Stubs' Steel. Rosewood Handle. Nickel Plated Ferrule.
Price, 25 Cents.
All tools warranted. Prices stated include postage. Send stamp for Catalogue.
Machinists' Marking Gauge and Scratch Awl Combined.

Machinists' Scratch Awl.

Steam Pumps,
AIR COMPRESSORS,
Friction Hoisting Engines,
Vacuum Pumps & Condensers,
GENERAL MACHINERY,
Steam Engines.
Capacity to bore Cylinders 110 Inches Diameter, and turn Fly Wheels of 24 feet.
THE NORWALK IRON WORKS CO.
South Norwalk, Conn.

Drawing Instruments
AND MATERIAL, PAPER, &C.
G. S. WOOLMAN,
116 Fulton Street, New York.
Fully priced and illustrated Catalogues.

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Maker and Patentee of
IMPROVED HYDRAULIC JACKS,

Punches, and Roller Tube Expanders,
AND
DIRECT ACTING
Steam Hammers.
Communications by letter will receive prompt attention.
Jacks for Pressing on Car Wheels or Crank Pins made to order.

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SOLE MANUFACTURERS OF

FILES AND RASPS

HAVING THE INCREMENT CUT.

Also, FILERS' TOOLS and SPECIALTIES.

"Nicholson File Co's" Files and Rasps.
"Double Ender" Saw Files.
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"Racer" Horse Rasps.
Handled Rifflers.
Machinists' Scrapers.
File Brushes, File Cards.
Surface File Holders.
Vice File Holders.
Stub Files and Holders.
Improved Butchers' Steels.

Manufactory and Offices at **PROVIDENCE, R. I., U. S. A.**

NEWARK STEEL WORKS.

BENJAMIN ATHA & CO.

MANUFACTURERS OF

CAST STEEL

WE MAKE GRADES OF STEEL SPECIALLY ADAPTED TO THE MANUFACTURE OF LATHE TOOLS, CHISELS, TAPS & DIES

BENJ. ATHA. NEWARK, NEW JERSEY. J. ILLINGWORTH.

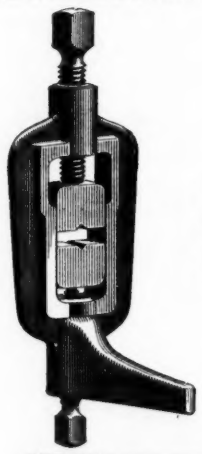
C. W. LeCOUNT,

SOUTH NORWALK, CONNECTICUT,

Manufacturer of

LeCount's Die Dogs,

Have a Steel Frame, with two screws, so as to throw the center of Die the same distance from tail of Dog on a small piece as on a large. The Dies are hardened, and a good job with Hardened Steel Screws. Extra Dies can easily be fitted to suit any special work, or will be furnished as below:



PRICES.

	EXTRA DIES.	OPENS.
No. 1,.....	$1.25	½ Inch.
" 2,.....	1.60	¾ "
" 3,.....	2.00	1 "
" 0, Amateurs or for ft lathes	1.25	¾ "

When ordering Extra Dies please state which you require, the V or Tongued.

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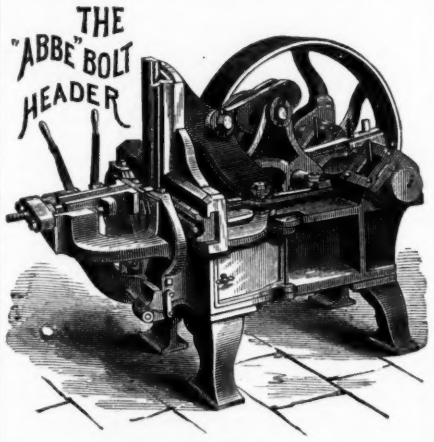

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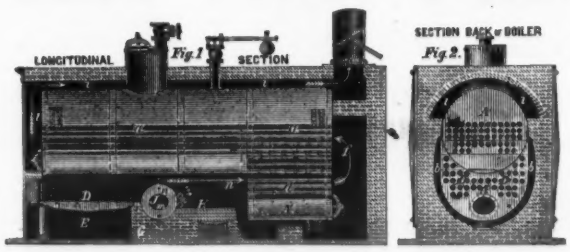

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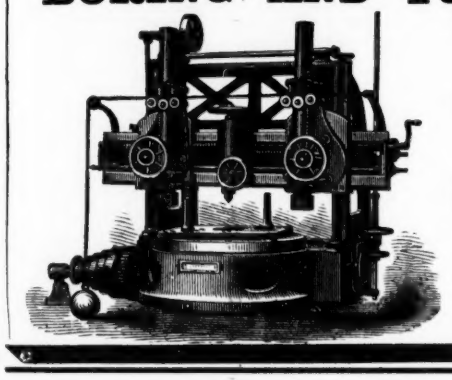

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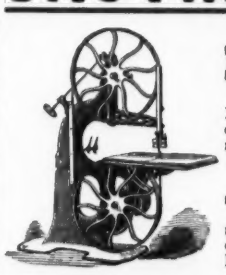

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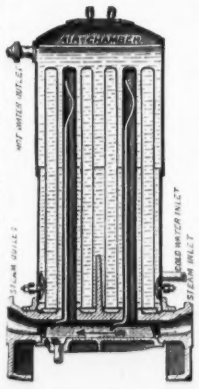

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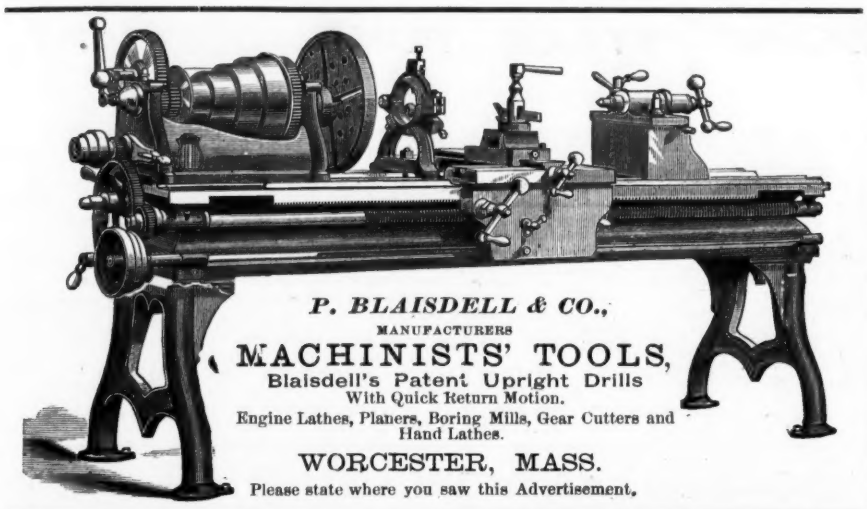

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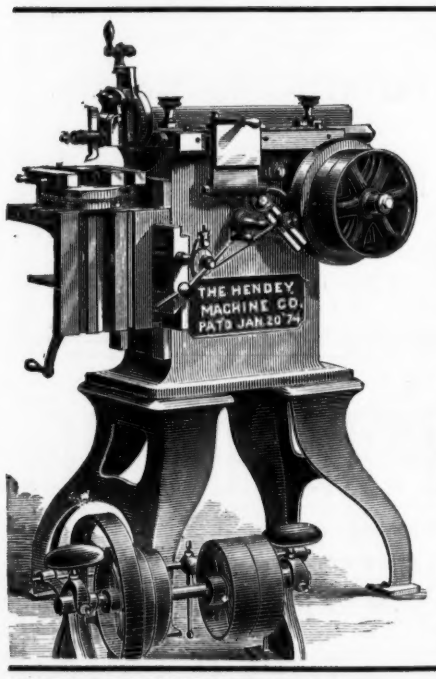

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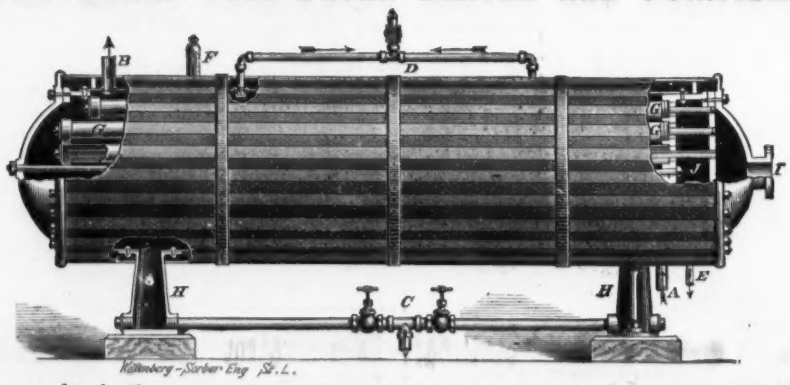

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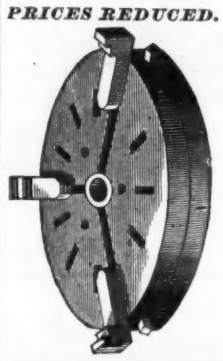

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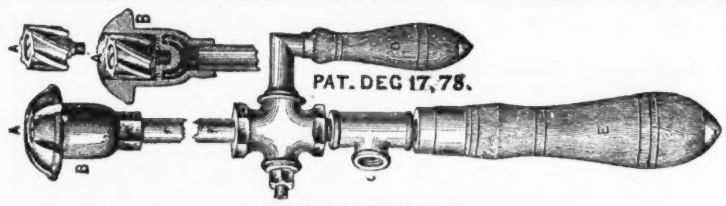

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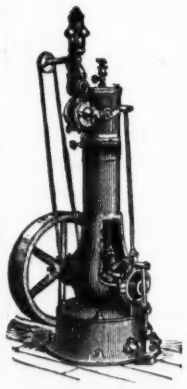

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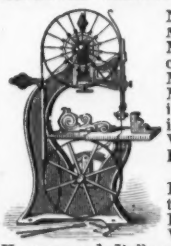

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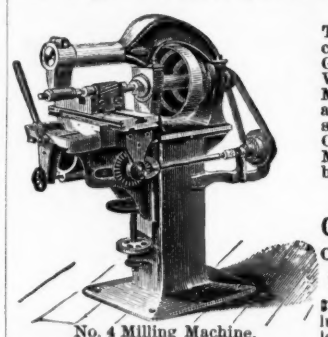

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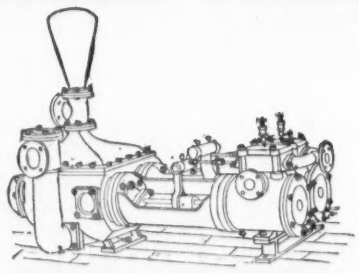

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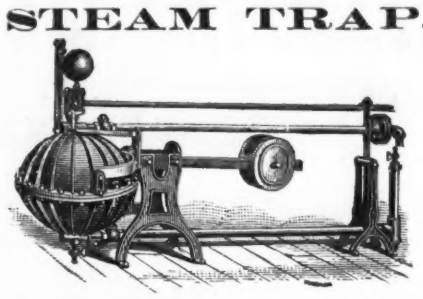

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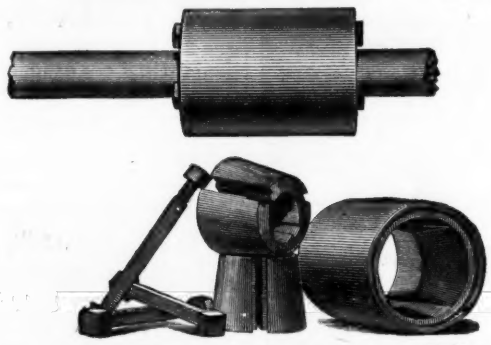

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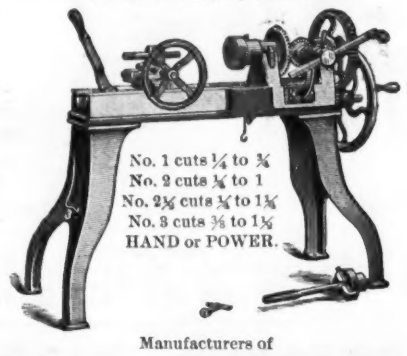

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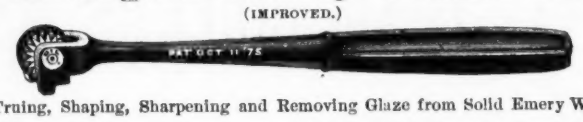

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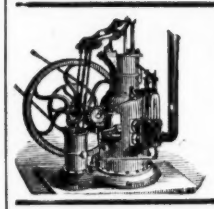

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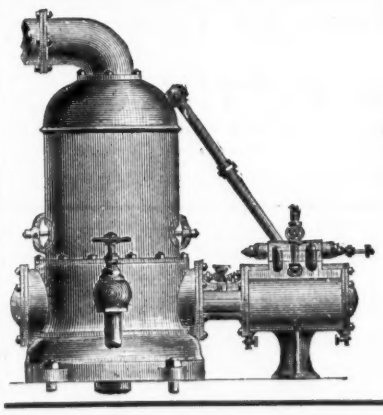

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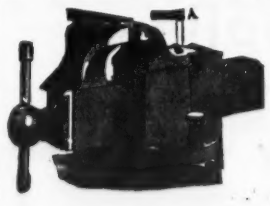

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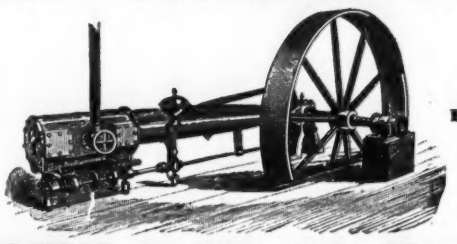

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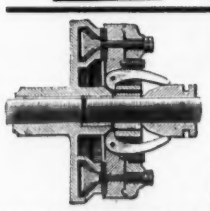

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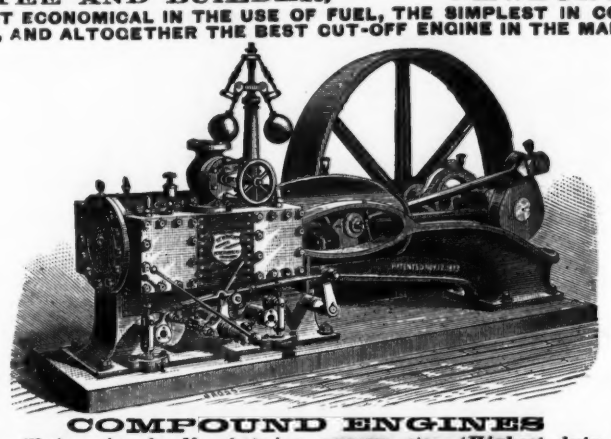

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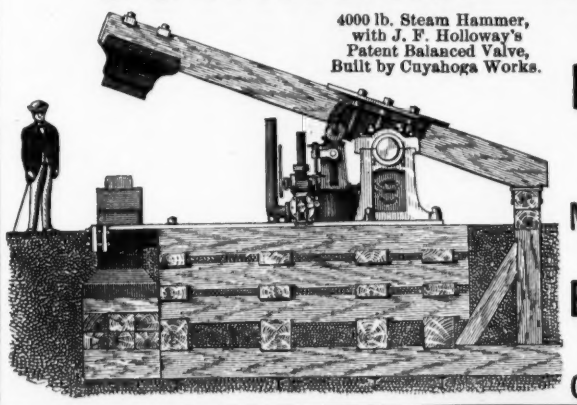

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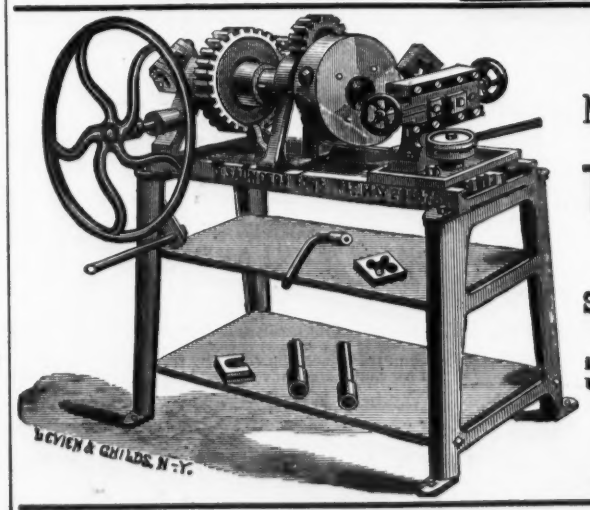

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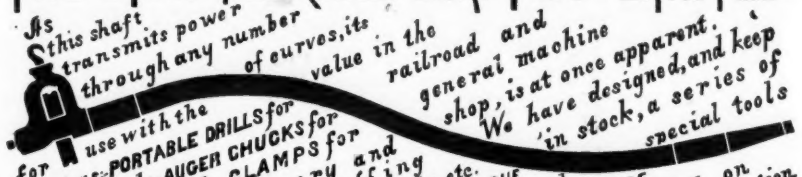
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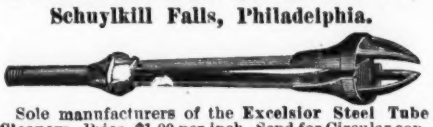

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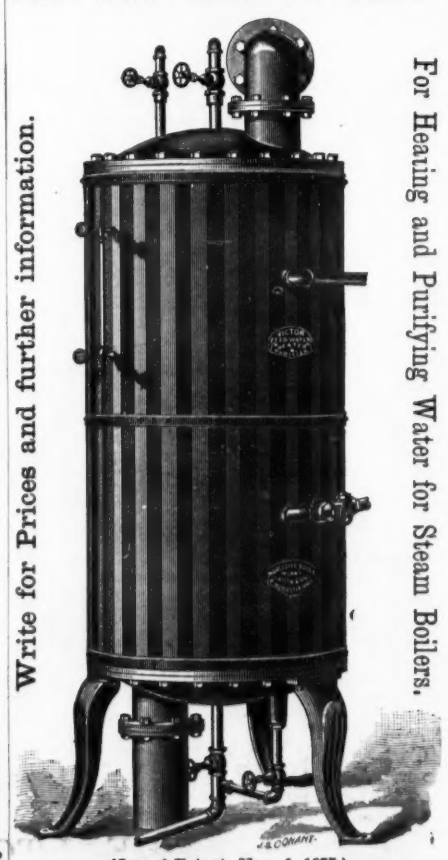

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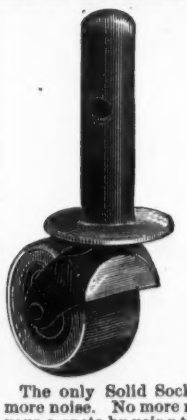

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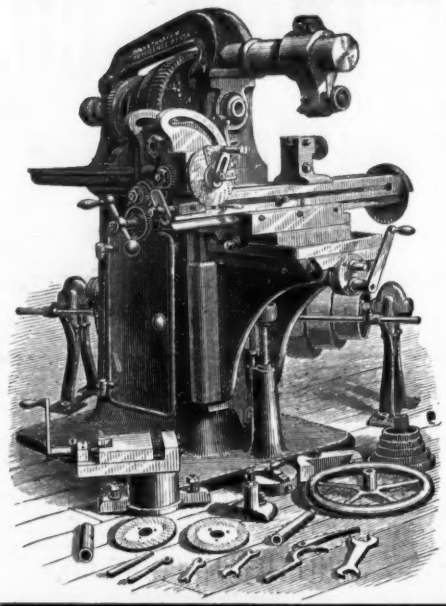

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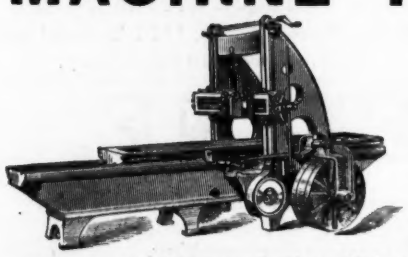

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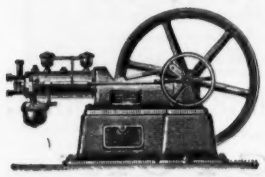

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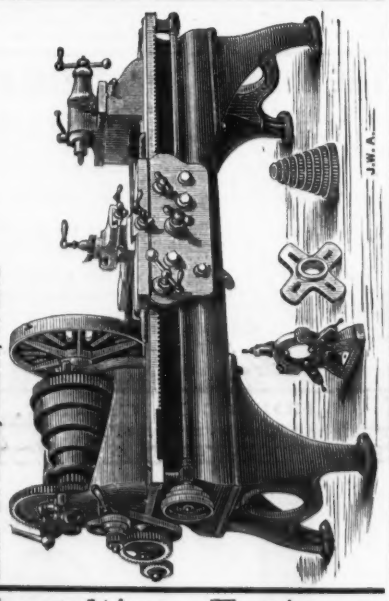

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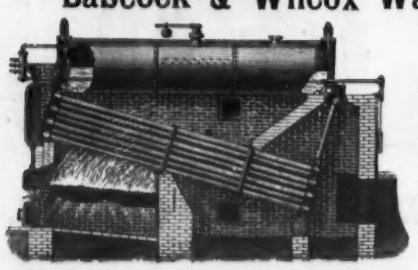

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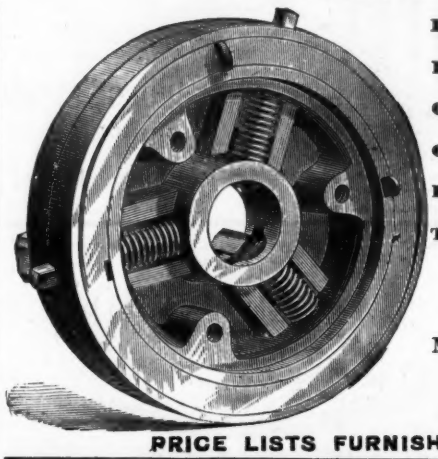

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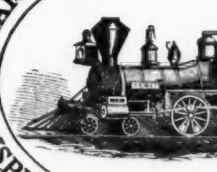

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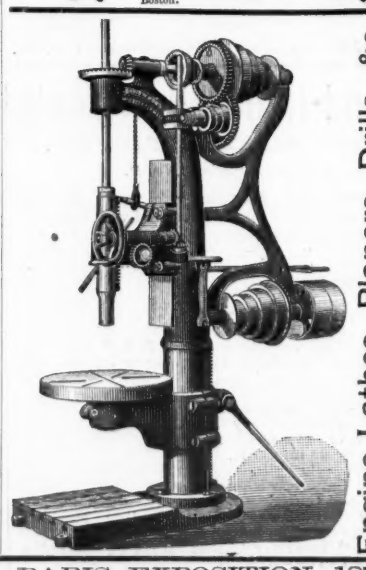

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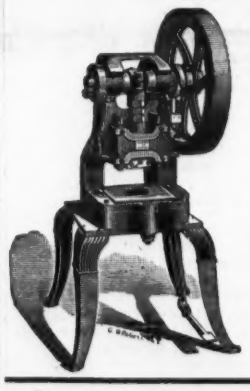

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